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# EXAMINATION QUESTIONS

ON

# FORTIFICATION, TOPOGRAPHY, MILITARY LAW, AND TACTICS.

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COLONEL L. GRIFFITHS.

600052295T

# EXAMINATION QUESTIONS

ON THE MATTER IN THE

# AUTHORIZED TEXT-BOOKS

OF

# FORTIFICATION, TOPOGRAPHY, MILITARY LAW, AND TACTICS.

COMPILED BY

COLONEL L. GRIFFITHS,

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# PREFACE.

THE questions in this book are arranged more especially for the use of militia officers preparing to compete for army commissions; they will also assist the gentlemen cadets at Woolwich and Sandhurst, as well as the officers at the Royal Staff College.

The chief parts of the prescribed Course Books are herein taken in order, and questions are added which have been set in examination papers.

In teaching these subjects, my custom is to lecture on a portion, with pauses to enable short rough notes of the lecture to be taken; the students afterwards read the matter in their Course Books, and then they make sketches with fair notes from their rough ones. On the next day I examine, verbally, on the previous day's lecture, by questions such as are in this book.

It is thus that students are advised to use examination questions, as a check upon, not as the source of, their studies.

When answers require hand-sketches (and answers are generally most shortly and lucidly given with them), all dimensions should be written on the drawings.

Thirty years' experience as an Examinee at Woolwich, Sandhurst, and for the Staff College, and afterwards as an Instructor and Examiner, prompts me to give the following advice to candidates :—

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44. To a line 3″ long apply a segment of a circle which shall contain an angle of 80°.

45. Make scales of $\frac{1}{400}$ to read yards and feet; 30 miles to 1 inch, to read miles diagonally; 9 miles to 6 inches, to read hundreds of yards; 1 mile to 8 inches, to read tens of paces of 30 inches.

46. Construct a rectangle to contain 12 square inches, with sides in proportion of 3 to 1; construct a square of equal area; and also a right-angled triangle of area equal to the square, with base on one side of the square.

47. Draw two scales, to read yards, and chains: $\frac{1}{720}$.

48. A drawing represents 80 yards by 4·2 inches: it is wished to represent this country on a drawing three times larger; construct a scale for the new plan.

49. What proportions exist between two drawings, one drawn on scale of $\frac{1}{2880}$, the other showing a distance of half a mile represented by 5½ inches?

50. The distance between two places, 9 miles apart, is represented by 16 inches; draw a scale to read tens of yards diagonally.

51. Draw a rhombus (*i.e.* a quadrilateral figure having 4 equal sides), of which two of the angles are 40°, and the sides 3¾ inches. Divide the rhombus into 9 figures equal to each other and similar to the original rhombus. Draw an isosceles triangle having a base of 3 inches, and area two-thirds of that of the rhombus. Measure and write down the size of the angles of the triangle.

52. Obtain, by construction, the greatest and least fourth proportionals to 3 lines, 1¾, 2½, and 1½ inches long. Measure and write down their lengths.

53. Draw a plain scale to show metres and tenths

of metres, 5·3 metres being represented by 7·4 inches. Draw a diagonal scale, comparative to the above, to show yards, feet, and (diagonally) inches. Show the calculations, and give the representative fraction. From the diagonal scale, draw a line 2 yards, 2 feet, 2 inches, long. Assume 1 metre = 39 inches.

54. Describe a circle with a radius of 2 inches; and, by two different methods, divide its area into three equal parts.

55. Draw the segment of a circle, having a radius of 3½ inches, to contain an angle of 115°. In the segment, inscribe a circle with a radius of ¾ of an inch.

56. Construct two squares, with sides of 2·1 and 1·4 inches, respectively. Construct a third square of which the area shall be equal to the sum of the areas of the other two.

57. In a circle of 2·9 inches radius inscribe an equilateral triangle, and a regular octagon.

58. Construct the triangle ABC; AB, AC, BC, being 4·8, 2·7, and 3·2 inches long, respectively. Determine the position of the point D, so that the angles ADC, BDC, may contain 35°, and 25°, respectively. Measure the lengths of AD and BD, and the sizes of the angles of the triangle ABC, and write them down.

59. Draw a plain scale, in which 5·4 miles are represented by 7·2 inches; to measure miles (up to 5), and furlongs. Show the calculation, and give the representative fraction.

60. Draw a scale comparative to the above; to show nautical miles (up to 4), tenths of miles, and (diagonally) hundredths of miles. From the scale draw a line, 3·33 nautical miles long. Show the calculation.

*N.B.*—1 *Nautical mile equals* 1·15 *common mile.*

61. Construct two squares on sides of 2·95 and 1·55 inches respectively. Construct a third square with an area equal to the difference of the areas of the first two.

62. At the extremities, A and B, of a straight line AB, 160 yards long, the angles BAC, BAD measure 120° and 45°, and the angles ABC, ABD, 25° and 90° respectively. Determine the positions of the points C and D; measure and write down the distance CD in yards, and also magnitude of angles ADC, BCD.

*Scale (which need not be drawn)*, 50 *yards* = 1 *inch.*

63. Construct two circles with radii of 2·4, and 1·9 inches respectively, making the centres 4·1 inches apart. Construct a third circle, with a radius of $1\frac{3}{4}$ inches to touch each of the other circles externally. From the centre of the second circle draw a tangent to the first one.

64. On the same straight line, $4\frac{1}{2}$ inches long, and on the same side of it, construct two segments to contain angles of 60° and 120° respectively. Draw a circle, of 1 inch radius, to touch the first segment internally, and the second externally.

65. A distance of $8\frac{1}{2}$ miles measures on a map 21·6 inches. Construct the scale of the map to show yards; 5000 yards being the greatest, and 100 yards the least, dimension shown. Give the calculation, and the representative fraction.

66. Construct a diagonal scale of $\frac{1}{600}$ to show chains, (up to 5), and single feet. Give the calculation.

*N.B.*—1 *chain* = 66 *feet.*

67. Draw a right line AB, 4·25 inches long; bisect it; and, at the point of bisection, erect a perpendicular. From A and B, the ends of the right line, make angles of 60°; and produce the lines till they meet. In the triangle so formed, inscribe a circle.

68. The representative fraction of a plan is $\frac{1}{6000}$. Draw two plain scales suitable to the drawing; one to measure in yards, and the other in paces of 30 inches.

69. Calculate the representative fraction of a scale of 9 inches to a mile.

70. On a map, from which the scale has been cut off, it is found that the distance between two points measures three inches. The actual distance between them is, when measured, 1050 yards. Draw a scale of miles for the map.

71. In a plan of a field-work, the width of the ditch at the top is represented by 2·33 inches, and at the bottom by 1·33 inches. The dimensions of these are found to be 21 and 12 feet respectively. Construct two scales for the plan; one to measure feet and the other yards; and calculate the representative fraction.

72. Construct an isosceles triangle ABC, the angle at the vertex C being 80°, and the base AB being 3·20 inches in length. In the triangle thus formed, inscribe a circle; and also circumscribe a circle about it.

73. State which of the Marquois scales would be most convenient to use in drawing plans to the following scales $\frac{1}{84}$, $\frac{1}{96}$, and $\frac{1}{120}$. Show your calculations.

74. What is the principle of the construction of a protractor?

75. Explain the principle on which Marquois scales and triangle are constructed and used.

76. Construct an angle of 90° at the end of a line 1·8 inches long without producing the line.

77. Construct angles of 60°, 45°, 105°, 80°.

78. Construct a regular pentagon of 1·4 inch side, and inscribe a circle in it.

79. Protract an angle of 100°; and inscribe a circle,

with 2·4 inches diameter, touching the sides which contain the angle.

80. Construct half a regular hexagon of 1·6 inch side, and reduce it to a triangle of equal area.

81. Explain how, on ground, with use of only a measuring tape and pegs, you would:—

(*a*) Bisect an angle.
(*b*) Construct an angle of 90° at end of a line.
(*c*) Construct an angle of 60°.
(*d*) Construct an angle of 105°.
(*e*) Lay out a rectangle 16 × 4 feet.

82. By aid of only Marquois scales and triangle, divide a line 2·8 inches long into seven equal parts.

83. Make scales of $\frac{1}{360}$ reading yards, and feet diagonally; 15 yards to one inch, giving representative fraction; and another for a plan double the size of one drawn to scale of $\frac{1}{1800}$.

84. Draw a rectangle 5 × 2 inches; and calculate its area.

85. Construct a right angled triangle, with base 3 and perpendicular 4 inches; and calculate its area.

86. Construct a triangle with sides of 2, 3, and 4 inches; and calculate its area.

87. Construct a right-angled triangle with perpendicular 2·4 inches and hypothenuse sloping $\frac{1}{2}$; and calculate its area.

88. Construct a triangle with base horizontal; sides sloping $\frac{3}{1}$, $\frac{1}{1}$; perpendicular, to apex, 2 inches; and calculate its area.

89. Construct a trapezoid; parallel sides, 3 and 2 inches; their distance apart, 1·8 inches; and calculate its area.

90. Explain the terms:—" Plan," " Profile Section," " Oblique Section," " Elevation," " Slope of $\frac{3}{4}$."

91. On ground sloping downwards to the front at $\frac{1}{15}$ draw, to scale of $\frac{1}{96}$, the profile of a parapet with command of 9 feet, thickness 12 feet, banquette 4 feet, slope leading to banquette $\frac{1}{2}$, interior slope $\frac{3}{1}$, superior slope $\frac{1}{4}$, exterior slope $\frac{3}{4}$; and calculate its area after reducing this figure to a triangle.

92. Determine widths at top of triangular ditches:—
(*a*) With area of 100 square feet, sides sloping $\frac{1}{1}$.
(*b*) With area of 81 square feet, sides sloping $\frac{1}{1}$, $\frac{2}{1}$.
(*c*) With area of 70 square feet, sides sloping $\frac{3}{4}$, $\frac{4}{3}$.

93. State the three chief principles to be fulfilled in every fortification.

94. What is the distinction between a "ditch" and a "trench;" and when is each the most suitable method in constructing a parapet?

95. Define the terms:—"Relief," "Command," "Command of Observation," "Remblai," "Deblai," "Thickness of Parapet," "Magistral Line," "Defilade."

96. What thickness of parapet is required to resist musketry for a considerable period; and what, to resist field artillery?

97. What considerations regulate:—
(*a*) The height of a parapet;
(*b*) The superior slope;
(*c*) The exterior slope;
(*d*) The depth, and the width of ditch?

98. What is the primary object of the berm? Between what limits may its width vary? What other objects does it serve? What are its defects?

99. How may the defects of a berm be remedied?

100. How can head-cover be provided for defenders on banquette ?

101. Hand-sketch a stockade, in elevation and profile, when not required to resist artillery fire.

102. Hand-sketch a wall 8 feet high, and a thick hedge 5 feet high, in profile, and show how you would, in 3 hours' time, utilize them for defence by Infantry exposed to artillery fire.

103. Hand-sketch one of each of the following works, and state the time, as well as the numbers of men, required for their construction—

(*a*) Shelter pits for 50 men.
(*b*) Shelter trench for 100 men, in two ranks, kneeling.
(*c*) A gun epaulement.
(*d*) A gun-pit.
(*e*) Isolated rifle pits for 5 men.
(*f*) Connected rifle pits for 6 men.
(*g*) A parapet of ordinary dimensions, on level ground, to resist field artillery, with the name of each line of the profile written on it.

104. If the area of the profile of a parapet be 120 square feet, of a trench in rear, 48 square feet, what should be the depth of a trapezoidal ditch to supply the rest of the earth if its width at top be 12, and its sides be vertical ?

105. A trench parapet is to have command 6 feet, relief 12 feet, cover in trench 8 feet below crest, to resist musketry, have banquette for single rank, interior slope $\frac{4}{1}$, superior $\frac{1}{6}$, exterior $\frac{1}{1}$, no berm, ditch slopes $\frac{1}{1}$, and triangular in section; trench 4 feet wide at bottom, with rear slope $\frac{1}{2}$, and steps to banquette with rise and tread of 1 foot.

Calculate the width of ditch at top.

Draw the profile to scale $\frac{1}{60}$.

106. If area of profile of remblai be 144 square feet, and the soil be such that the earth increases $\frac{1}{11}$ in bulk when excavated, what should be the area of profile of deblai?

107. Scale $\frac{1}{180}$: draw the plan of a straight line of parapet. 20 yards long, with terminal slopes at $\frac{1}{1}$, command 8 feet, thickness 12′, banquette $4\frac{1}{2}$′, slope leading to banquette $\frac{1}{2}$, interior slope $\frac{3}{1}$, superior $\frac{1}{6}$, exterior $\frac{1}{1}$, escarp $\frac{2}{1}$, counterscarp $\frac{4}{1}$, berm 3′, ditch 10′ deep, and of sufficient width to provide earth required for the parapet.

108. Scale $\frac{1}{96}$: draw the profile of a parapet from the following conditions: command $5\frac{1}{2}$′, thickness 12′, ditch triangular in section, with slopes $\frac{1}{1}$, and breadth 12′; no berm; exterior slope $\frac{1}{1}$, superior $\frac{1}{4}$, interior $\frac{3}{1}$; trench 2′ deep, with steps in front and rear of 1 foot rise and tread, and sufficiently broad to supply the required earth.

109. Describe the glacis and its uses. What rules have to be followed in determining its command and slopes?

110. Two ditches have, each, a profile area of 72 square feet, the escarp and counterscarp of each sloping $\frac{3}{2}$ and $\frac{3}{1}$ respectively; the depth of one ditch being 12 feet, and of the other, 6 feet. Draw the profile of each ditch and compare their respective merits and defects.

*Scale* 3 *feet to* 1 *inch.*

111. On the profile of the deep ditch in the last question draw a fraise projecting from the counterscarp; and, on that of the shallow ditch, a palisade on the counterscarp side, showing how each is fixed.

112. Draw the profile of a parapet on level ground having a command of $7\frac{1}{2}$ feet, thickness 15 feet, superior slope $\frac{1}{5}$, exterior slope $\frac{5}{6}$, interior slope $\frac{3}{1}$; banquette for

double rank, the ascent to it being by steps having a rise and tread of 1 foot. Calculate the area of the parapet. Scale $\frac{1}{60}$.

113. Draw the profile of a parapet and trench on level ground, the command being $5\frac{1}{2}$ feet, parapet 12 feet thick, superior slope $\frac{1}{6}$, exterior slope $\frac{1}{1}$, interior slope $\frac{3}{1}$; banquette for single rank; trench 2 feet deep, the ascent from the bottom of the trench to the banquette by steps, 1 foot wide and 1 foot high; rear slope of trench $\frac{1}{2}$. The ditch (not to be drawn) has a profile area of 54 square feet. Determine the width of the trench, so that, with the ditch, it may supply the necessary earth for the parapet. Scale $\frac{1}{60}$.

114. A field-work is constructed of the following dimensions: command 8 feet, relief 17 feet, thickness of parapet 12 feet, tread of banquette 3 feet, slope of banquette $\frac{1}{2}$. Interior slope $\frac{3}{1}$, superior slope $\frac{1}{6}$, and exterior slope $\frac{1}{1}$.

The earth is obtained from a trench in rear and a ditch in front.

The trench is 2 feet deep, and 16 feet wide at top; both its front and rear slopes are the same as the slope of banquette.

The escarp and counterscarp slopes are $\frac{2}{1}$. Calculate the dimensions of the ditch required, and draw a profile of the work. Scale $\frac{1}{96}$.

115. Show by freehand drawings, or describe in writing, how you would prepare for defence a wall 6 feet high, a wall 10 feet high, a hedge on small bank.

116. Between what limits is it customary to construct the interior, superior, and exterior slopes of parapets; and why?

117. Draw suitable profiles for the ditch and trench which are to supply the earth for a parapet having a

profile area of 120 square feet. Assume the depth of the trench to be 3 feet, the ascent to the banquette to be by 3 steps, and the slopes of the escarp and counterscarp to be $\frac{3}{2}$ and $\frac{3}{1}$ respectively. The ditch is to supply $\frac{4}{5}$, and the trench $\frac{1}{5}$, of the earth required. Scale $\frac{1}{60}$.

118. A field-work of the following dimensions is to be made: command 8 feet, relief 17 feet, parapet 15 feet thick, banquette for single rank, berm 3 feet, banquette slope $\frac{1}{2}$, interior slope $\frac{3}{1}$, exterior slope $\frac{1}{1}$, superior slope $\frac{1}{6}$. The earth is obtained from a trench and ditch. The trench is 2 feet deep, and 15 feet wide at top, its front slope being the same as the slope of the banquette, and its rear slope $\frac{1}{1}$. The escarp and counterscarp slopes are $\frac{2}{1}$ and $\frac{3}{1}$. Calculate the dimensions of the ditch required, and draw a profile of the work. Scale $\frac{1}{96}$.

119. With a view to giving additional cover to men manning a work, sandbag loopholes may be arranged on the top of the parapet. Describe in detail their construction. If sandbags are not available, what substitutes may be used?

120. On a scale of $\frac{1}{120}$ draw the profile of a parapet with the following dimensions: height 4 feet 6 inches, thickness 12 feet, superior slope $\frac{1}{6}$, exterior slope $\frac{1}{1}$, interior slope $\frac{3}{1}$, banquette for double rank; trench 3′ deep, ascent to banquette by steps 18 inches broad and 18 inches high, rear slope of trench $\frac{1}{1}$, no berm, counterscarp $\frac{3}{1}$, escarp $\frac{1}{1}$, depth 3 feet. Area of profile of ditch to be equal to area of profile of trench. Calculate the time to execute the work in easy soil, and the working party necessary for a length of 40 yards. Diggers at 4 feet intervals.

*N.B.—A gabion revetment, and no builders required.*

121. What conditions should be fulfilled by an efficient obstacle?

122. Name the obstacles in ordinary use, giving a hand-sketch and short description of each.

123. What should be the charge of gunpowder for a common fougass, five feet deep?

124. At what rate does Bickford's mining fuze burn?

125. What are the most favourable descriptions of valleys in which to form inundations by dams; and why?

126. How is a bank formed as a dam; what thickness should it have at top; and what slopes to its sides?

127. What are the respective advantages and defects of dams causing inundations, from a stream parallel to the front of a defensive position; or from one perpendicular to it?

128. What are the best, and worst, woods for abattis, and why? Show on a profile sketch how you would arrange abattis in front of a counterscarp so as to be protected from artillery fire.

129. Describe large military pits, giving their dimensions. What position would they usually occupy when used to strengthen a field-work?

130. Name the revetting materials in ordinary use, and the slopes at which they retain earth.

131. State dimensions, time, and workmen required for construction, method of manufacture, various uses of, advantages and defects as revetting material, of brushwood gabions, and fascines.

132. What metal gabions have been used? State their advantages and defects?

133. A parapet, to be manned by infantry, 80 yards long, is to have its interior slope of gabion revetment;

state what material will be required, and how it should be used.

134. An epaulement 8 feet high, without banquette, is to have its interior slope revetted with fascines ; what material is needed, and how should it be used if the soil be loose sand?

135. What is a fascine choker, and how is it used?

136. A parapet, for infantry defence, 50 yards long, is to have its interior slope revetted either with sand-bags or sods. State material required in each case, how it is to be used, and the respective advantages of each method.

137. How are hurdles made, and how used as revetment?

138. How can earth be retained at a steep slope when no other means are at hand except heather and fir-trees?

139. In building a parapet from stiff soil, in summer time, how can revetting material be dispensed with?

140. Describe the iron-band gabion ; giving its weight, time of construction, and the number of men required to make it. Compare its advantages and defects with those of the brushwood gabion.

141. Describe, with the aid of a sketch, how to form a revetment composed of a row of fascines at the bottom, next a row of gabions, and then two rows of sand-bags. Mark the dimensions. What quantities of each would be required for revetting a parapet 60 yards long?

142. Define "Salient angle," "Re-entering angle," "Flank," "Line of defence," "Outline of a work," "Faces of a work," "Gorge," "Capital," "Open works," "Closed works," "Half-closed works."

143. State the seven chief principles to be observed in determining the outlines of field works.

144. Why are large angled salients the best?

145. What is a redan; its defects; and how are these remedied?

146. Hand-sketch a double redan, showing the lines of fire obtained from it, and indicating the dead ground in its ditches, if the relief be 15 feet, and the musketry fire at its maximum depression.

147. In what positions do the defects of redans disappear?

148. Distinguish between the works called "Forts," and "Redoubts."

149. What disadvantages are inherent to all closed works, and what are the remedies for them?

150. What considerations regulate—
(*a*) The size of a redoubt;
(*b*) The shape of it;
(*c*) The garrison for it;
(*d*) The strength of a reserve?

151. What are the defects of all redoubts, and how can these be remedied?

152. Hand-sketch the cross section of a kaponier in a ditch 6 feet deep.

153. Hand-sketch, in profile, a counterscarp gallery in ditch 8 feet deep.

154. Scale $\frac{1}{540}$. Draw plan of interior and exterior lines of parapet (21 feet apart), and of ditch (15 feet wide), of a rectangular redoubt, 50 × 20 yards, showing its ditches all defended, and laying out the work so as to avoid enfilade fire on the long face from the fire of an enemy in the position of the top of your paper.

155. What are the defects of curvilinear lines of fortification?

156. Hand-sketch a block house suitable as a reduit to an outer work which screens the block-house from artillery.

157. What defects have forts as compared with redoubts?

158. Trace the best form for an irregular star fort where the lines joining the salients form angles of 120°, 100°, 90°, 125°.

159. State defects common to all star forts.

160. On two lines, 200 yards long (scale $\frac{1}{1800}$) draw one front of a bastioned fort, and one front of a double star fort; and state the comparative advantages and defects of these traces.

161. Scale $\frac{1}{2160}$. Draw one front of a bastioned fort of maximum size, writing the name of each part on it.

162. How should the counterscarp of bastioned forts be traced; and what is the best arrangement for the ditch in front of the curtain?

163. What is the brisure of the curtain, and its object?

164. Draw two fronts of demi-bastion trace, arranged so as to form a bridge-head.

165. What is a reduit, and how should it be traced?

166. A redan with faces 50 yards long is to be manned by single rank, and to have a reserve of $\frac{1}{5}$ of the garrison; how many men are required?

167. A lunette has its front faces, 40 yards long, manned by double rank; of its rear faces, 15 yards long, each has three guns; the reserve is to be $\frac{1}{6}$ of the garrison; what is the total strength of infantry required?

168. A redoubt, shaped like half a regular hexagon, is to be constructed to suit a garrison of 875 men, of whom $\frac{1}{5}$ are to form a reserve; the long face is to be manned by single rank the others by double rank; the two front salients are to be defended by three guns in each, en barbette. Draw the outline of the work to scale $\frac{1}{3600}$.

169. A regular six-pointed star fort is to be constructed to suit an infantry garrison of 395 men, of whom $\frac{1}{6}$ are to be held in reserve; half the work is to be manned in double, the remainder in single rank; in each of the single rank faces there is to be a gun firing through an embrasure. Draw the magistral line of this work; scale $\frac{1}{720}$.

170. Determine the infantry garrison necessary for a five-sided bastion fort, allowing for a reserve of $\frac{1}{5}$; the faces being 40 yards long, the flanks 20 yards long, and the curtains 60 yards long; there being a gun en barbette at each shoulder angle, and a gun firing through an embrasure in each flank. The faces and flanks are to be manned by double rank and the curtain by single rank.

171. What are the respective merits and defects of caponiers and counterscarp galleries? Show on sketches how you would place the one and the other for the complete defence of the ditch of a square redoubt, assuming the enemy's fire to proceed from a point in front on the prolongation of one of the diagonals of the square.

172. Draw the plan of the crest lines of a lunette and of a double redan, the total length of the crest of each work being 160 yards, the salients being each 100°, and the shoulder angles of the lunette being 135°. Calculate the garrison of each work, if manned by single rank with a reserve of $\frac{1}{4}$, providing room for a gun at each salient angle. Scale $\frac{1}{720}$.

173. What are the advantages of bastioned forts as compared with other closed field-works? Why can bastioned forts be but seldom employed? What is the minimum length for the exterior side? Give the reasons.

174. By what rules is the length of the crest line of a field-work determined? Apply these to ascertaining the length of the crest of a lunette to contain a garrison of 300 men, of whom $\frac{1}{5}$ are in reserve; the faces are to be twice the length of the flanks, and are to be manned by double rank, the flanks by single rank, there being a gun (not en barbette) in each face and flank.

175. What rules govern the size of salient and re-entrant angles in works? What are the defects of each; and how are they remedied?

176. Draw the crest line of one front of a demi-bastioned fort, exterior side 180 yards, perpendicular $\frac{1}{6}$; scale 30 yards to 1 inch. Calculate the amount of dead ground in the ditch in front of the flank if the relief is 18 feet and the superior slope $\frac{1}{6}$.

177. In what different ways is fire obtained from guns in works?

178. Hand-sketch, in plan and profile, a direct sloping embrasure for a field gun firing through a parapet 12′ thick; writing, on the parts representing them, sole, cheeks, sill, genouillère, neck, mouth, splay, merlon.

179. When are counter-sloping embrasures suitable; and why, in such cases, are they preferable to sloping embrasures?

180. Which part of an embrasure is most liable to destruction, and how should it be guarded?

181. How can the gunners behind an embrasure be

protected from an enemy's fire of bullets and pieces of shell?

182. What space is required for the working of a field gun?

183. What are the defects of embrasures?

184. From what heights above the ground do guns fire when mounted on siege carriages, field carriages, and on field carriages provided with brackets?

185. How much, as a maximum, should the sill be below the crest of the parapet?

186. What are the advantages and defects of barbettes; and how may the latter be remedied?

187. Scale $\frac{1}{120}$. Draw the plan of a barbette for one field gun behind a straight line of parapet 12′ thick, with command 7½′, and banquette 3′ wide; slopes as usual.

188. What are bonnettes?

189. For what different purposes are traverses required?

190. How is the length of a traverse to cover an entrance determined?

191. Which would require the most labour in construction, one traverse 10′ high, or two traverses 6′ high, behind one another, of the same thickness at top and of the same length; and why?

192. Hand-sketch and describe field casemates, splinter proofs, triangular magazines, rectangular magazines.

193. Which way should barrier gates open? How wide should they be to admit artillery?

194. What material is needed to give communication, across a ditch 20 feet wide, into a work?

195. Of what use are the ribbands of a bridge?

196. What is the meaning of the term "Defilade?"

197. Why is a parapet 8′ high required, on level ground, to give cover to its defenders?

198. What is the quickest way of obtaining cover by parapets?

199. When does a parapet need to be more than 8′ high.

200. Explain the terms: "Plane of sight or tangent plnae," and "Plane of defilade."

201. How are works defiladed by trace?

202. How, practically, do you determine the height of parapet required?

203. What height should a parapet on level ground be in order to give cover of 8′ for 15 yards in its rear from the fire of an enemy on a hillock 700 yards from the work and 10′ above its terreplein?

204. A parapet, 6′ high, is exposed to frontal fire from an enemy 600 yards distant and 8 feet above the terreplein of the parapet; how much should the terreplein be lowered to give cover of 8 feet for 12 yards in rear of the parapet?

205. In what cases is a parados unnecessay for closed works?

206. What height of parados is required, to cover from reverse fire the defenders on the banquette of a parapet 8′ high; the parados being 20 yards, and the enemy (on a height of 12′), being 500 yards, in rear of the parapet?

207. State the rules to be followed in constructing traverses for the protection from enfilade fire—first, of infantry manning a line of parapet; and, second, of guns firing through embrasures.

208. How much cover from view will be afforded by a parapet 8 feet high, at a point 20 yards behind the crest, from an enemy on the brow of a hill which has a command of 20 feet over the crest, and is 490 yards distant from it, the ground behind the crest being horizontal? What cover from fire passing through the crest at a depression of 1 in 10, would be afforded by the same parapet at the same distance behind it, the ground in this case sloping 1 in 30 to the rear? What would be the simplest way of providing increased cover?

209. Show by means of sketches the best mode of tracing a rectangular redoubt in a hollow between two parallel ranges of hills, of defilading its interior, and of determining the height of the parados.

210. What three methods may be used, separately or in combination, for defilading a field-work? Describe the tangent plane and the advantages of using it.

211. One side of a traverse, 18 feet long, and 7 feet 9 inches high, has to be revetted with gabions, and fascines, and crowned with sand-bags. How many of each would be required?

212. What considerations determine the shape and size of a work?

213. What lines are marked on the ground in tracing a work?

214. How are the bases of oblique profiles obtained?

215. How is a ditch excavated so as to leave its sides at certain slopes?

216. Where are profile laths erected?

217. If the parapet is to be constructed on sloping or uneven ground, how are the heights on the profile laths obtained?

218. In ordinary soil, what number of workmen, and what tools, are required for construction of 80 yards in length of parapet and ditch?

219. What differences in the number of workmen are made in the cases of very easy soil, very difficult soil, and when the ditch is 20 or more feet wide?

220. How is a working party extended and posted?

221. What is the amount which a man can excavate in ordinary soil in a day's work?

222. A straight line of parapet and ditch, 100 yards long, is to be constructed; area of the profile is 117 square feet; diggers are to be 6′ apart; the excavation requires use of pickaxe; what men, tools, time, will be required?

223. In constructing a work with salient and re-entering angles, where will there be a deficiency, and where a superabundance, of earth; and what arrangements should be made in consequence?

224. What drainage arrangements are required when the ground on which a parapet is to be built has a slope to the front?

225. A parapet with ditch whose area of profile is 81 square feet, and that of trench 49 square feet, is to be constructed in easy soil, diggers 5′ apart; how many men, altogether, are needed at first, and how long a time will be required?

226. Show on a sketch (and give the names of) the tracing and cutting lines, and the position of the profiles, for a straight portion of parapet, 18 yards long, of ordinary dimensions, with a ditch 22 feet wide at the top. Mark the position of each of the workmen (supposing the soil to be very difficult) at the commencement of the work?

227. Estimate the number and the nature of the

workmen required for throwing up a line of parapet 60 yards long. Supposing the area of the profile of the ditch to be 126 square feet, how long should the work take to execute in easy soil?

228. Describe the positions of the diggers for commencing the construction of a field-work with—(1) a ditch in front (easy soil); (2) a ditch in front very wide at top (difficult soil); (3) a trench only; (4) a ditch and trench. What number of diggers would be required, in each case, to commence 30 yards of parapet; how long would the work take in (1), (3), and (4), assuming the soil to be easy and the profile area of the parapet 108 square feet?

229. A hundred yards length of parapet is to be thrown up in easy soil from a ditch in front; the area of the profile of this parapet is 108 square feet; the diggers are placed at 6 feet intervals. Calculate the number of men required to throw up the work, the number of reliefs, and the time required.

230. Enumerate, in order in which they should be undertaken, the operations necessary in tracing a field-work.

231. What number of men and intrenching tools should be required to execute a length of 300 paces of shelter trench in one hour?

232. Define the terms: "Lines," "Continuous lines," "Broken lines," "Intrenched camp," "Lines of contravallation," "Lines of circumvallation," "Intrenched positions."

233. What, only, should be expected of works of defence in intrenched positions; and, if properly constructed, what three advantages do they afford?

234. What are the defects of long continuous lines?

235. When are continuous lines suitable?

236. What advantages have broken lines over continuous ones?

237. Hand-sketch, and state the advantages and defects of, Vauban's redan line, redan line with brisure of the curtain, tenaille line, cremaillère or indented line, bastioned line.

238. Hand-sketch two closed works on two hills, with a valley between, and an indented line joining these works; sketch also a suitable profile for the continuous line.

239. Hand-sketch two lines with intervals, with a reduit in rear, for the defence of a position two miles long by 2000 men in the works and 12 field guns; the guns to be behind epaulements, outside the works. Where might heavier guns be placed advantageously?

240. In an intrenched position, why is it best not to place guns in the works; and what is the chief purpose of artillery fire in such cases?

241. A neck of land, 1000 yards wide, is to be defended by three flat (*i.e.* obtuse angled) lunettes, and by a retired polygonal redoubt commanding their gorges and the ground between them. Draw an outline plan of the position.

*Scale* 200 *yards to* 1 *inch.*

242. How should artillery be posted to assist in the defence of lines with intervals?

243. A line with intervals, is to consist of an advanced line of lunettes with obtuse salients, and a rear line of polygonal redoubts. Sketch a plan of the position, showing three lunettes and two redoubts. What would regulate the distance apart of the redoubts.

244. What nature of works is most suitable for the advanced works of a line with intervals? How should these works be traced with reference to each other? What position in these works should the guns occupy?

245. Define the terms: "Single bridge-head," "Double bridge-head."

246. For tactical reasons, what parts of rivers are most suitable for single, and what parts for double, bridge-heads ?

247. When a force has to prevent an enemy's passage of a river, only what proportion of it should be considered available as garrison for the bridge-head ?

248. Name the chief points for attention in arranging the works of a bridge-head.

249. Sketch an arrangement of works to form a single bridge-head covering three bridges, and suitable for defence by 1100 infantry and 12 field guns.

250. In a winding stream, how may the stability of a military bridge be affected by the velocity of the current, by shoals and deep water in tidal rivers, and by floods ? What precautions should be used in each case ?

251. Where are fords most likely to be found when there are no indications on the banks ?

252. What depths are fordable by artillery, cavalry, infantry ?

253. How may troops pass safely over fords when (*a*) the current is rapid; (*b*) where the depth is dangerous; (*c*) where the bottom of the ford is sandy or muddy ?

254. In the defence of a field-work, name, in the order of their importance, the arrangements which should be made.

255. What strength should be allotted to a reserve; where should it be posted; what is its purpose ?

256. What advantage does a house afford to its defenders; and what are its inconveniences ?

257. What considerations would guide you in selecting a house for defence?

258. How might you roughly compute the garrison for a house?

259. Name, in the order in which they should be treated, the steps you would take to put a house in a state for defence.

260. Describe tambours and machicoulis galleries.

261. Hand-sketch a tambour for flanking a street exposed to artillery fire.

262. State how you would place a two-storied house in a state of defence against artillery fire.

263. Under what two main heads may the cases be classified when villages may require to be defended; and what would be the differences in the arrangements?

264. Describe the process of barricading a window (without shutters) with sand-bags. Supposing it to measure 6 feet by 3 feet, give an estimate of the men, materials, and time necessary for completing the work. What are the general principles to be kept in view in fortifying "Posts?"

265. Show, by a sketch, how a tambour may be placed, so as to give flank defence to two walls at right angles; and describe the best method of constructing tambours if exposed to fire from field artillery.

266. What villages are suitable, and what unsuitable, for defence?

267. Name, in order of importance, the steps to be taken when preparing to defend a village.

268. How should a building be selected and utilized as a reduit? how should it be garrisoned? how should communications be arranged with regard to it?

269. If a village be too large for the garrison, how would you act?

270. What precautions are necessary in arranging for the barricade of a street?

271. By what different methods may attack on field-works be carried out?

272. At what period of the day, and why, are attacks generally made?

273. With artillery, infantry, and sappers, state how you would conduct the attack of field-works.

274. State how you would arrange for the attack of a house.

275. What quantity of powder is required to blow in an ordinary stockade? how would it be fixed and ignited?

276. What is tamping; its value; how performed?

277. Why is gun-cotton preferable to gunpowder for breaching stockades, etc.?

278. How would you overcome resistance of people behind a barricade?

279. How would you proceed to take a defended house?

280. How would you attack a defended village if unable to turn the position or to bombard it?

281. What is the most favourable position to occupy for defence; and why?

282. Whereabouts, on the level top of a hill with a gentle slope to the front, should a work be placed?

283. How, practically, would you determine the position of a work to be defended, if the required command be known?

284. When the slope of a hill (although accessible) is too steep to be defended by fire from its top, how would you arrange your works?

285. How, practically, would you determine the amount of ground, on an irregular slope, to be cut away so as to allow the fire from a parapet on the top to defend the foot of the slope in its front?

286. A parapet, with command of 8 feet, is to occupy the level top of a hill sloping 10°; what is the greatest, and what the least, distance behind the brow of the hill that the parapet should occupy?

287. Two strong works defend parts of a slope between which the ground is too steep to be easily assailable; how might this latter ground be utilized for defence?

288. What are flying, or swinging, bridges? How should such be arranged?

289. Describe the construction of a limber ladder bridge for passage of infantry in single file, and that of a trussed ladder bridge suitable for cavalry.

290. In a wooded country, how may a chasm be crossed by help of only the trees, hatchets, and spades?

291. Hand-sketch one frame of a single lock bridge as it is before launching, writing on it the name of each part.

292. What is the first operation before construction of a frame bridge?

293. For what spans are single lock bridges suitable? If a greater width has to be crossed, how would you arrange?

294. Sketch the longitudinal section of a double lock bridge, showing only the frames in position; and

state the spars to which the upper and the lower transoms are lashed.

295. How should the shore ends of baulks be supported and retained in position?

296. Define buoyancy; and state how you would calculate the buoyancy of a punt, rectangular in shape, 12 feet long, 4 feet broad, 1½ foot deep.

297. Name the component parts of an ordinary bridge, and state what represent these in a military bridge?

298. Mention the ten chief rules to be borne in mind when constructing military bridges.

299. Give the rules to be observed in crossing temporary bridges.

300. What arrangements on a temporary bridge should be made to provide for the safe transit of (1) cavalry; (2) field artillery?

301. For what cases are fixed piers unsuitable?

302. Hand-sketch trestles, of three sorts, for piers; state how they would be put in position, and how their stability may be afterwards increased.

303. How are pile piers constructed? what distance apart should they be?

304. What are the component parts of the service pontoon bridge?

305. Describe Blanshard's pontoons.

306. In what different ways may pontoon bridges be made?

307. How should a bridge on boats be formed?

308. Describe the construction of a barrel-pier.

309. How should timber be arranged and connected to form a raft bridge?

310. State the rules with regard to the comparative strengths of timber of various lengths, breadths, and thickness, to support weights.

311. If a baulk be 12′ long, 5 inches broad, 3 inches deep, what will be the difference in its bearing power if it be used:—

(*a*) With its depth 5 and breadth 3 inches; or
(*b*) With its breadth 5 and depth 3 inches?

312. If a beam 7′ long, 2 inches square in section, will support 400 lbs., what weight can be supported by another beam of similar timber 6′ × 3″ × 4″?

313. When infantry have to ford very rapid streams, how should they cross, and what precautions should be taken for their assistance?

314. A chasm 30′ wide, 6′ deep, is to be bridged with the following material:—

4 spars 15′ long, 6″ diameter;
4 spars 12′ long, 7″ diameter;
2 spars 14′ long, 3″ diameter;
4 spars 18′ long, 3″ diameter.

State how you would use these spars for construction of a frame bridge, and what other material you would require for its completion.

315. What is the weight of a cubic foot of fresh water?

316. How many gallons are there in a cubic foot of water?

317. What is the average weight of an infantry soldier in marching order?

318. Of what uses to a nation are fortresses?

319. When, and why, is it necessary for an invader to take a fortress?

320. In what different ways may fortresses be taken?

321. When are night attacks advisable; and when unadvisable?

322. Enumerate the five chief operations of a besieger.

323. If a fortress be not thoroughly invested, is its capture probable? State your reasons.

324. Define the expressions: "Parallel," "Approaches," "Parks," "Counter-batteries," "Sorties," "Counter-approaches."

325. At what period of the twenty-four hours are siege works usually commenced; when, and how, are they traced?

326. Name the three different methods by which siege trenches are made.

327. How is the length of the first parallel regulated?

328. How are the approaches directed, and of what use is the return of the approach?

329. What time is required for the construction of a parallel if made by simple trenching; if by flying sap?

330. How many men are needed for each relief in the construction of 3000 yards of simple trench work; and of 2000 yards of flying sap?

331. How are the working parties in a siege protected from sorties by night; and how, by day?

332. Describe the method of extending a working party.

333. Hand-sketch the profile of the first parallel, marking the tasks for the reliefs.

334. In marshy or rocky sites what variations must be made in the profile of parallels?

335. What are elevated, half-sunken, and sunken batteries? When is each form advisable?

336. Hand-sketch the plan and profile of an advanced battery of sunken form with a traverse for each gun.

337. What is the difference in profile between a siege battery for guns and one for mortars?

338. How is sapping performed?

339. Where, generally, must breaching batteries be formed?

340. Describe the assault of a breach.

341. What are the chief ways by which a defender hinders the progress of a siege?

# TOPOGRAPHY.

1. Two places on a map are 1·65 inches apart, their real distance being 1650 yards: draw the scale for the map, to read miles and hundreds of yards.

2. A plan drawn to a scale of $\frac{1}{10560}$ is to be copied so as to be four times the size of the original: make the scale for the copy, to read hundreds and tens of yards by the plain method, with single yards by diagonal method; draw a line representing 256 yards on this scale.

3. Make a scale of $\frac{1}{144}$, to read feet, and inches diagonally.

4. A French map shows a distance of 269 metres represented by 11·3 inches: considering the metre to be equal to 39 inches, make a scale of English yards to read distances from this map.

5. By help of Marquois scales only, make a scale of $\frac{1}{840}$ to read hundreds and tens of feet.

6. Construct a diagonal scale of 9 inches to a mile, showing 1200 yards, and reading to single yards.

7. What is the use of making military "surveys" of portions of country; and how does military "drawing" tend to give a better appreciation of the ground?

8. Give a definition of "military surveying."

9. What are the differences between ordinary maps and military surveys?

10. Define the terms:—"Plan," "Section," "Contour," "Gradient," "Water-shed," "Water-course," "Under feature," "Upper feature," "Knoll," "Neck or col," "Datum level," "Base," "Triangulation," "Bearing," "Check bearing," "Forward bearing," "Back angle," "Bench mark," "Cross bearings," "Form line," "Off-set," "Directing line," "Orthogonal," "Spur," "Station," "Traversing," "Interpolation," "Protracting," "Plotting," "Closing," "Meridian," "Scale," "Representative fraction of a scale," "Salient," "Re-entrant."

11. With an uncontoured map, how would you form an idea of the shape of the country represented?

12. Take a piece, 2 inches square, of an ordnance map drawn to a scale of 1 inch to the mile, and copy it to a scale of 3 inches to the mile, only inserting such items as would be needed in a military survey; draw the scale of your copy, giving its representative fraction, and show the direction of magnetic north if variation be 22° west.

13. Give examples, in ink, of the various conventional signs used on military maps, writing on each what is represented.

14. By what different ways are the forms and slopes of ground represented by shading, and on what suppositions?

15. Draw plan and profile section of a hill 90 feet above level of sea, sloping 8°, 5°, 3°, respectively, between the three contours from top to bottom; contours at 25′ vi.; scale 12″ to 1 mile; in section H : B :: 6 : 1 : figure heights of contours in plan.

16. Having made a scale of HE, at 10′ vi., to read slopes on a map, you find that on one part of the map the contours are shown at 100′ vi.; how must you proceed in order to read such slopes?

17. Three square miles of country are to be represented on a piece of paper which is 8 inches long and 6 inches broad; draw a suitable scale, to read hundreds of yards.

18. From the top of a hill 600′ above the sea level the clinometer gives the slopes as recorded on the line of direction paced down the hill—

3° for 480 yards.
8° for 180 yards.
5° for 432 yards.

Draw to scale of $\frac{1}{10560}$ the contours and form lines which would indicate these slopes, numbering the height of each contour above the sea level.

The contours to be at 50′ vertical interval.

The slopes to be further indicated by shading.

19. Why is it usual to exaggerate the vertical heights, in making sections of ground?

20. Hand-sketch contours representing any ground with which you are acquainted, showing spur, knoll, and upper features; figure the heights of the contours at 50′ vertical interval, the lowest being 100′ above a datum level; and make a section down the line cutting upper and under features; H : B :: 3 : 1. Scale $\frac{1}{2112}$.

21. Why is it right that, on every survey made with a prismatic compass, the variation of the compass should be noted?

22. How can the variation of the compass be determined?

23. What causes variation of compass; and how may it be further affected locally?

24. Describe the prismatic compass.

25. Show infantry and cavalry, in line, and in column; and guns limbered up, and in action; as given in the authorized plate of conventional signs.

26. Draw the conventional signs for a marsh, houses, a gravel pit, trees, roads with hedges, water, and bridges.

27. In making a survey what ideas would guide the arrangement of triangulation points ?

28. If it be impossible to obtain such a long base as you would desire to enable you to determine the position of distant points, how would you proceed ?

29. How can you test the accuracy of your triangulation ?

30. If the forward bearings of certain lines be 342°, 18°, 190°, 175°, 270°, what will be the backward bearings of these lines.

31. The bearing of a line is 140° ; it is wished to lay off lines at angles of 90° and 60° respectively with this line, and on the right hand side of the observer ; what must be the bearings of such lines ?

32. In a field book of a traverse, where are the distances in the centre column measured ; what are the meanings of the figures and angles recorded outside the centre column, of the circle drawn round certain figures in the centre column, of the single lines drawn across the column, and of the double lines drawn across it ?

33. How are distances measured with a Gunter's chain and arrows ?

34. How many links are there in the 66 foot chain, and how are they marked ?

35. Why is Gunter's chain so very convenient for finding the acreage of land ?

36. Measurements of a tract of country ABCDE are found to be, AB 6700, BC 5000, CD 6400, DE 7350, EA 7350, AC 9600, DE 11,000 links. Plot this figure

to scale of 20 chains to 1 inch; calculate the areas of the triangle ABC, and of the other two triangles in one operation; state the acreage of the whole figure; test this result by reducing the figure to a triangle of equal area having its base on AE produced, and calculating the area of this triangle.

37. Describe the method of laying down angles with a protractor, both those above, and below, 180°; and also how the divisions on the instrument itself are arranged.

38. Construct a scale of horizontal equivalents for contours 200 feet apart, and slopes of 19°, 24°, 4°, 13°, and 9°.

*Scale 6 inches to 1 mile.*

39. Explain the use of the "horizonal equivalents" marked on the "scale of shade" of the protractor.

40. Construct a scale of "horizontal equivalents" on the following conditions:—

Scale 12 inches to 1 mile.
Contours 150 feet apart vertically.
Slopes 32°, 17°, 4°, and 25°.

41. In what direction do you read off all angles, in laying them down with a protractor?

42. Explain the use of the parallel lines on survey paper; what they are intended to show; and how is the protractor used with them.

43. What are the gradients of the limits of accessibility of slopes for infantry, cavalry, artillery, wheeled transport, and what is the limit for manœuvring ground?

44. A map drawn to a scale of 6 inches to 1 mile is to be copied to a scale of 3 miles to 1 inch: what will be the comparative sizes of the original and the copy? How would you proceed in making such a copy?

45. You are provided with a scale of 6 inches to

1 mile, showing yards: how will you use this scale so as to draw to a scale of 2 inches to 1 mile; what number of yards on the given scale will you measure so as to represent 126 yards on your drawing?

46. In what order is it wisest to copy the items on a map?

47. What lines most certainly indicate the direction of contours, forming the skeleton for contouring?

48. Hand-sketch in profile slopes of $\frac{1}{10}$, $\frac{2}{1}$, 12°, 2°.

49. A portion of country, 3 × 2 miles, is to be represented on paper, 9 × 6 inches; what will be the representative fraction of a convenient scale?

50. On the edge of a protractor angles are marked from 0 to 180° on the outer, and from 180° to 360° on the inner edge: why is this? how is such protractor used in plotting bearings?

51. What is a clinometer? how is it used?

52. Assume stations A and B at 4 inches apart, and B due east of A; from Z bearing of A is found to be 325°, and of B, 55°; find position of Z.

53. What drawbacks are there in using the prismatic compass?

54. In a field sketch, state the different methods employed in obtaining the position of an object, with assistance of the prismatic compass.

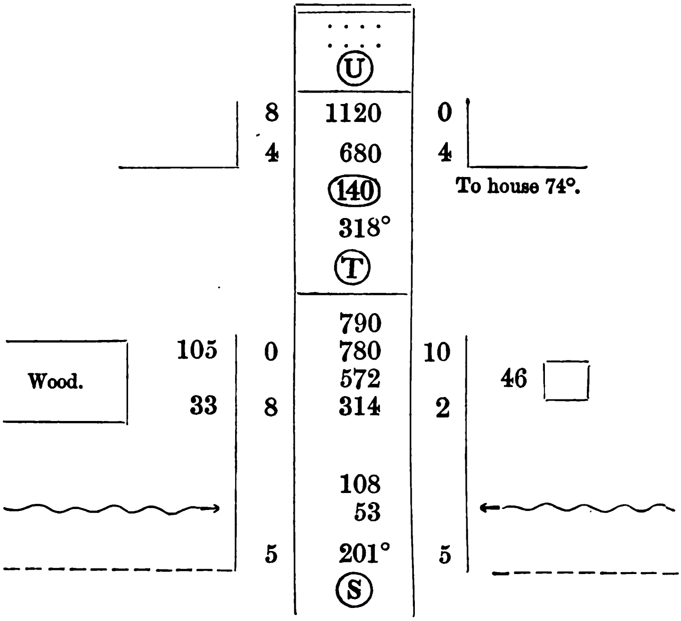
55. Having previously laid down a triangulation, you are desirous of ascertaining your position, by prismatic compass, with regard to two or more points already known; show by diagram how you would do this.

56. Two of the crest lines of a fortification are observed to converge to a point on the side of the country. It is necessary to lay down on the ground the

direction of the line which bisects the angle so formed. Explain how this may be done with the prismatic compass, without linear measurement.

57. Plot the accompanying field book to a scale of 12 inches to a mile, and state in figures the length and bearing of the closing station line OS.

Close on Station S.



Begin on Heath ride.

58. In what direction are all angles read with reference to north in such magnetic instruments as are used in surveying?

59. Supposing that, some years after a survey had been taken, it was required to extend it on the same piece of paper, what is, first, necessary in order to have

the means of protracting the angles to suit the fresh conditions of magnetic variation? Illustrate the answer by a hand-sketch.

60. Show, by diagram, a good triangulation suitable to 9 square miles of country. Base to be 2 inches long.

*Scale 2 inches to 1 mile.*

61. What is the object of triangulation? Draw a diagram to illustrate the method of triangulating for a survey of 9 or 10 square miles intended to be laid down on a scale 3 inches to a mile. The diagram may be shown on a scale of one inch to a mile, so that it may occupy no more space on your paper than is necessary.

62. Give examples of what you consider to be good, and bad, triangulations for a survey, showing 10 or 12 trigonometrical points.

63. B bears 80° from A, and is 1200 yards from it; from a point C, bearings to A and B are taken at 225°, and 132°, respectively; and from D the bearings to A and B are found 315°, and 32° 30′, respectively.

Find, on a scale of 6 inches to a mile, the distance CD; and, assuming the variation of the compass to be 20° west, find also what angle CD makes with the true north.

64. Draw such a diagram of triangulation as you would carry out if the ground were favourable for the survey of a tract of country of 5 square miles in extent; to be laid down on a scale of 3 inches to a mile.

65. Explain why the measurements of a base line for a survey should be conducted with much more care than is essential for the measurements for the details of a survey.

66. Arrange 9 points round A and B, 2 inches apart, assumed as a base-line, so as to cover 9 square miles of

country, or thereabouts, with a good and efficient triangulation.

*Scale* 2 *inches to a mile.*

67. Draw a diagram of a triangulation such as you would adopt, if the country were favourable as respects "points," for a survey of three square miles of country to be laid down on a scale of 6 inches to the mile. Scale for the diagram of points 1 inch to 1 mile. Length of base to be $\frac{3}{4}$ of a mile.

68. What is the use of triangulation ?

69. Plot the following distances and bearings :—

*Scale* 12 *inches to a mile.*

| | Bearings. | Distances. |
|---|---|---|
| From A to B | 30° 30′ | 120 yards. |
| „ B „ C | 91° 15′ | 98 „ |
| „ C „ D | 358° 0′ | 225 „ |
| „ D „ E | 320° 45′ | 258 „ |
| „ E „ F | 276° 30′ | 218 „ |
| „ F „ G | 210° 0′ | 196 „ |

Find the distance from A to G and the angle which the line AG makes with the magnetic meridian.

70. What is a traverse, in surveying ? Explain the two methods of measuring the angle contained by contiguous lines of the traverse; and draw a comparison between them.

71. Plot the following distances and angles, (not being azimuth angles) :—

Distance from AB, 8 chains. Observed angle from A to B with reference to line AZ 105° 0′

| | | | | |
|---|---|---|---|---|
| From B to C | 4 chains. | Forward angle | 136° | 30′ |
| „ C „ D | 3·5 „ | „ „ | 15° | 15′ |
| „ D „ E | 7 „ | „ „ | 47° | 45′ |
| „ E „ F | 6·30 „ | „ „ | 136° | 10′ |

Measure and write down the distance from A to F in the direct line; and also the angle which EF makes with AZ, the zero line.

72. Give an imaginary example of the method of keeping a field book in traversing. Three stations will be sufficient.

73. Plot the following bearings and distances of a traverse :—

| | Bearings. | Distances. |
|---|---|---|
| From A to B | 270° 20′ | 195 yards. |
| „ B „ C | 32° 0′ | 207 „ |
| „ C „ D | 5° 40′ | 230 „ |
| „ D „ E | 82° 30′ | 101 „ |
| „ E „ F | 330° 0′ | 250 „ |

Find the distance from A to F.

*Scale* $\frac{1}{2640}$

From a point O the bearings of the points E and A were observed to be 85° 30′, and 152° 0′ respectively; interpolate the position of the point O; and find the distance OE and OA. The magnetic variation being 15° east, show the position of the true north, in the customary manner.

74. Plot the following bearings and distances of a traverse survey :—

| | Bearings. | Distances. |
|---|---|---|
| From A to B | 90° 0′ | 15 yards. |
| „ B „ C | 133° 30′ | 311 „ |
| „ C „ D | 28° 0′ | 263 „ |
| „ D „ E | 138° 0′ | 314 „ |
| „ E „ F | 26° 30′ | 325 „ |
| „ F „ G | 90° 30′ | 20 „ |

Find and note the distance from A to G, and the bearing of G from C.

*Scale* 12 *inches to a mile.*

75. What is the general rule in the selection of station lines whilst performing the operation of traversing?

76. To scale of 20 chains to 1 inch, plot the irregu-

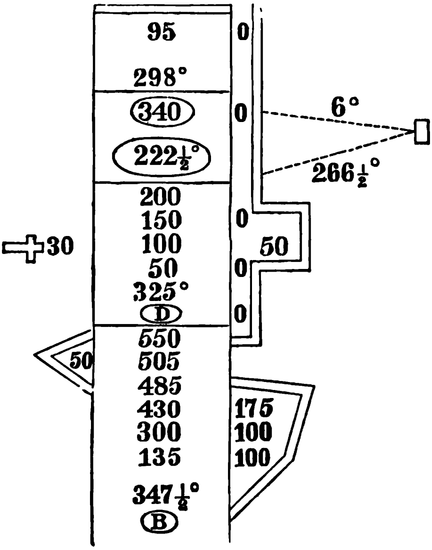
lar figure AKHBGFEDC of which the base AB measures 60 chains, whilst the horizontal angles are, BAK 60°, BAH 40°, ABK 45°, ABH 51°; on other side of the base are BAC 85°, BAD 70°, BAE 56°, BAF 35°, BAG 44°, ABC 50°, ABD 40°, ABE 69°, ABF 79°, ABG 92°; state the length of KE, and the dimensions of the angles KEB, EKB.

77. Plot the boundaries of a field ACDE, to scale of 20 chains to 1 inch; and calculate its acreage. AC is 9600 links; CD, 6400; AD, 11,000; DE, 7350; AE, 7350, links.

78. To scale of 12″ to 1 mile plot the following data of triangulation and traverse:—

Base AB is 720 yards; B bears 102° from A. Bearings from A are: to C, 24°; to D, 56¼°; to F, 135½°; to E, 158°. Bearings from B are: to E, 240°; to A, 282°; to C, 312½°; to D, 347°; to F 225½°.

Closed on C.



From B to C.

79. Draw 6 lines at the following distances apart, viz.: $\frac{5}{8}$, $\frac{2}{8}$, $\frac{4}{8}$, $\frac{3}{8}$, $\frac{4}{8}$ of an inch. Assume that these lines represent contours of sloping ground, at 10 feet vertical distances, the slope being a continuous descent from the first to the last of the six contours.

*Scale for the horizontal distances* 200 *feet to an inch. Scale for the vertical distances* 50 *feet to an inch.*

The datum is to be at 75 feet below the highest contour. Draw a section on a line inclined at an angle of 25° with the direction of the contours, which may be straight lines.

80. In making a section of ground, on a scale of 10 inches to a mile, how can the necessary spaces between the contours above the datum line be found from the Sandhurst protractor, without actually making a scale ?

81. How many kinds of under features are there ? Give a definition of each.

82. Describe the process of contouring, in field sketching.

83. Express by a series of contours, 12½ feet apart, on a scale of 12 inches to a mile, a piece of ground, 1000 yards by 700 yards, in which there is a difference of elevation of 100 feet between the highest and the lowest points. In two places on this plan, draw the contours sufficiently close to show the steepest slope accessible for cavalry, and for artillery ; and mark these places accordingly.

Draw a section through the contours under the following conditions :—

Horizontal scale, 10 inches to a mile.
Proportion of vertical to horizontal scale, as 4 to 1.
Contours, 18 feet apart.

Shade half the space covered by the contours according to the proper scale of shade.

84. A is the top of a hill, 225 feet above high water mark on the coast line; and, from A, a series of section lines are run to the coast. On line ABC, AB is 238 yards long, and slopes 6°; the ground for the rest of the line to C slopes 8°; ADE makes an angle of 30° with ABC, and lies on its right. AD is 255 yards, slope 4°. For the rest of the line the slope is 10°; 30° to the left of ABC, and 30° to the right of ADE, are lines AF, and AG; the ground in the direction of these lines sloping in each case 8°. Contour the ground to the coast line for 75 feet vertical intervals.

*Scale* 12 *inches to a mile.*

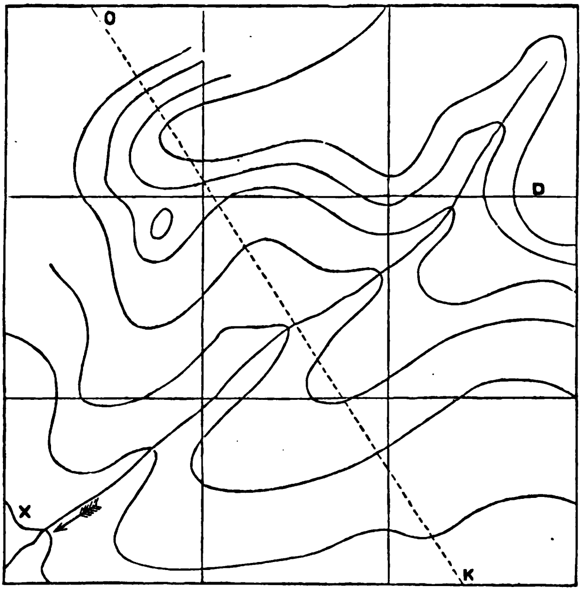
Draw a section of the ground on the line *xy*, passing through the point D, and at right angles to ADE. Scale for the horizontal distances, 12 inches to a mile. Scale for the vertical distances, 100 feet to an inch. Put a datum line at 50 feet below high water mark; and figure the section from this datum.

85. What do you understand by impossible contours? Give two or three examples.

86. A hillside is found to have an inclination to the horizon of 27°; ascertain, by construction, the difference of level between two points, 100 yards apart, measured on the slope at right angles to the direction of its contour lines.

87. Represent the following slopes on the system you have been taught, blending the slopes the one into the other, 30°, 22°, 17°, 7°, 3°.

88. Represent by contours some imaginary hill-forms enclosing a valley on three sides; with water-courses which unite, and flow out of the valley on the fourth side, dividing the hills. The scale to be 6 inches to a mile, and the contours to embrace an area of about 3 square miles. Fill in with shading a portion of drawing 2 inches square.



89. Copy diagram exactly. Contours are supposed to be at 10 feet vertical interval. Show by figures, viz. I., II., III., IV., etc., which are the salient and which are the re-entrant angles; which is the crest; and, of the under features, show which is a knoll and which is a spur. State elevation, in feet, of D above X. Draw dotted lines, showing the axis, or water-shed, of the two most prominent under features. Draw a section on the dotted line OK. Scale 12 inches to a mile. Contours at 10 feet vertical interval. Exaggeration of vertical to horizontal distance, at 5:1.

Copy the diagram again; fill the contours in either by horizontal hachures or by stumping.

90. Represent, by means of contours, any hill feature which you have sketched during your course of study; and then fill in between the contours to a

sufficient extent to show that you know how to apply the authorized scale of shade.

91. Draw 6 parallel curved lines at the following distances apart, viz.: ⅓, ½, ¼, ¾, and 1½ inches. Assume that these lines represent the contours of a hill at 20 feet vertical intervals, the first being the highest; and make a section on a line of steepest inclination. Scale 20 feet to an inch. Show on the section a "datum line;" and explain your reasons for assuming for it the position in which you place it.

92. Draw from memory the contours of a part of the ground of one of your field-sketches, including the highest and lowest points, a knoll, and a spur. Number the contours from the lowest ground. Make a section, or, if necessary, more than one section, passing through each of the four features above mentioned, with an exaggeration, of the heights to the distance, of 5 to 1.

93. Draw two lightly dotted lines intersecting, or nearly so, also as to represent a water-shed and a water-course. Draw imaginary contours. Shade your drawing.

94. Show, as accurately as you can, the characters of the shades you have been taught to employ for the representation of the following slopes: 5°, 10°, 17°, 27°.

95. Draw from memory a plan of any valley in the neighbourhood you know, representing by contours the hills which enclose it. Shade a portion of the plan with pen or pencil, in order to show that you know how to blend varying slopes. State how far the chief slopes represented are practicable for the three arms, and what fractional numbers would express the gradients.

*Scale 6 inches to a mile.*

96. Draw 6 straight and parallel lines at the following distances apart, viz: ¼, ⅔, ½, ¾, and ⅓ of an inch; suppose these lines to represent the contours of a hill,

the first line being the highest contour, and the slope falling in the same direction throughout. Draw a section of the hill, assuming the contours to be at 25 feet vertical interval. Scale for vertical distances, 50 feet to an inch. Show a datum line; and explain its object.

97. Draw 9 horizontal lines parallel to one another at the following distances apart: $\frac{1}{4}$, $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{3}$, $\frac{2}{3}$, 1, $\frac{1}{2}$, $\frac{2}{3}$ inch. Let a line of vertical intersection cut these horizontal lines at an angle of 30°, a fall be expressed down to the sixth parallel, and, from that, a rise. Construct the section with the following conditions:—

Contours, 40 feet vertical interval.
Heights to distances, as 4 to 1.

*Scale* 15 *inches to a mile.*

98. Draw a portion of ground, 4 inches by 6 inches, showing, a base, triangulation, traversing, contouring, and a few conventional details such as you have been accustomed to work at in your field sketches. Draw a vertical intersection line in such a direction as will best express the character of the ground; and draw the section on that line, with an exaggeration of the heights to the distances as 4 to 1.

99. Draw 5 parallel lines at the following distances apart, viz.: $\frac{1}{4}$, $\frac{1}{3}$, $\frac{1}{2}$, $\frac{2}{3}$, and $\frac{3}{4}$ inch. Assume that these lines represent contours at vertical intervals of 25 feet, on a scale of 8 inches to a mile; draw a section of the ground which they represent, exaggerating the vertical scale to four times that of the horizontal scale. Shade your drawing.

100. Draw an outline of any hill with which you are intimately acquainted, including an upper and three under features; and express the slopes by scale of shade to the extent of 3 inches by 4 inches.

101. Lay down a section from right to left with the following measurements, on a scale of 8 inches to a mile,

giving the heights exaggerated to the distances as 6 to 1. Assume the point A at 140 feet above the sea:—

| From | To | Contours of 20 feet. | Horizontal distances in yards. |
|---|---|---|---|
| A | B | Level on plateau ... | 300 |
| B | C | Fall ... ... | 85 |
| C | D | " ... ... | 110 |
| D | E | Level ... ... | 70 |
| E | F | Rise ... ... | 65 |
| F | G | Level top of knoll | 120 |
| G | H | Fall ... ... | 90 |
| H | I | " ... ... | 140 |
| | | Total | 980 |

102. Two plans of the same ground are placed before you, one drawn on a scale of 2½ inches to a mile, the other on a scale of 2½ miles to an inch; show the length of the line which will represent 3½ miles for each plan.

103. Explain precisely what you mean when you make use of the term "horizontal equivalent," illustrating your reply by sketches in plan and section.

104. The distance between two places, 18 miles apart, is represented by 4½ inches. Draw a scale for the map, showing miles and furlongs.

105. If B, C, are two objects in a straight road, 247 yards apart, and an observer measures the angle BAC to be 82°, and also knows AB to be 170 yards, find his distance from the road by construction.

*Scale* 50 *yards to an inch.*

106. From an elevation of 200 feet, the banks of a river have the angular depressions of 45° 30′ and 18°. Find the breadth of the river.

*Scale* 100 *feet to an inch.*

107. A gentleman's house stands on the edge of a

lake, with a boat house on the other side. From a point on the lawn the distances to both are measured and found, respectively, to be 120 yards and 372 yards from it, the angle formed between the lines being 75°. What is the distance across the lake?

108. Show by an example the method of finding the height of an inaccessible object on sloping ground. Construct the figure, and state the result in feet in the particular example you take.

109. Assume stations A and B to be 4 inches apart, and B to be due east of A. From D, the bearing of A is found to be 25°, and of B 55°. Find the position of D. Again, from A the horizontal angle between B and C is found by a sextant to be 60°, and the angle from B between A and C is 67°. Find the point C. Ascertain also, and write down in yards, the distance between D and C, on the assumption that the plan is drawn to a scale of 8 inches to a mile.

110. Three trigonometrical stations A, B, C, are so situated that A and B are 1200 yards apart; B and C, 1050 yards apart; and A and C, 1780 yards apart. Also, C is observed from A to make, with the magnetic meridian, an angle of 83°; and B lies north of AC. From a point $x$, the bearings of A and C are observed to be 321°, and 46°, respectively. Ascertain the distance of $x$ from the point B, and the angle which $x$ B makes with the magnetic meridian.

*Scale 300 yards to an inch.*

111. Two hills stand apparently immediately over one another, at horizontal distances of 950 yards and 550 yards, with elevations of 20° and 15° from the position of an observer; what is their difference in height? and how far are their summits apart?

112. If, in constructing a diagonal scale, of 30 inches to a mile, in yards, it is only required to express

a distance up to 500 yards, what must be done in order to lay down that distance before subdividing it? And, down to what parts of a mile, would the scale read when finished?

113. Two angles of elevation taken, 100 yards from each other, to the top of a ship's mast lying at anchor in a river, of which the banks are flat, are respectively 42° and 29°. What is the extreme height, the eye of the observer being 12 feet above water?

114. The stations A, B, and C, form the points of a triangle of which the side AB = 620 yards, BC = 513 yards, and AC = 995 yards. From a point D, I observe that the angle between A and B is 32° 30′, and the angle between B and C is 38° 15′. Find the position of D, and its distance from B.

*Scale* 300 *yards to an inch.*

115. Two observers at A and B, 800 yards apart, find that the bearing from A to B is 110°; from A to C, 30°; from B to C, 320°; what is the distance of C from each observer?

116. An observer, on a vessel, 40′ above the sea level, notes that the angle of elevation of an enemy's shore battery is 5°; when the vessel has moved half a mile towards the battery, the angle of elevation is found to be 15°; find the range from the second position, and determine the height of the battery above the sea.

117. At 73 feet from a flag-staff, the angle of elevation to it is $25\frac{1}{2}$°; find the height of the flag-staff.

118. From the topmast of a ship, 42 feet above the water, the angle of depression to a buoy is 22°; find the distance, in yards, to the buoy.

119. On one side of AC, which is 500 yards long, a point B is distant 400 yards from A, and 500 from C; on the other side of AC is a point $x$, at which lines from A

and B subtend an angle of 23½°, and from B and C an angle of 50½°; plot the figure.

120. What are the meanings of the expressions, "Horizontal Equivalent," "Vertical Interval," with regard to contours?

121. If the vertical interval between contours be 10′, what will be the horizontal equivalents for contours showing slopes of 3°, 5°, 10°, 12°, 20°, respectively?

122. Make a scale of horizontal equivalents showing slopes of 2°, 4°, 7°, 9°, 15°, 25°, on scale of 12 inches to 1 mile, where the contours are at 50′ vertical interval.

123. How would you use the last scale of horizontal equivalents to read slopes of ground represented on a drawing to scale of 6 inches to 1 mile, where the contours are at 100′ vertical interval?

124. What fractions nearly represent slopes of 4°, 6°, 10°?

125. What slope is represented between two contours, 120 yards apart on plan, if the lower contour be figured as 200 and the upper as 250 feet above the sea level?

126. Hand-sketch 4 contours representing two upper features with an intervening valley; the slopes on brows of hills to be 8°, on sides of valley 15°, and of bottom of valley $\frac{1}{20}$; contours at 10′ vertical interval; scale 24″ to 1 mile; make a section across salients of hills and the valley, exaggerating the heights by a multiple of 3.

127. Shade, by stumping or hachuring, the last example.

128. Scale 6″ to 1 mile; contours at 25′ vertical interval. A line of direction, from top of a hill down its salient, has a bearing of 100°; it falls 168 yards at 10°; 190 yards at 8°; is level across a saddle for 50 yards;

rises for 64 yards at 5°, to an under feature which is 50 yards broad; then falls for 400 yards at 3°; and 240 yards at 1°; north and south of the saddle, which is 50 yards broad in those directions, the ground falls at 6° and 4° respectively. Draw the contours and form lines; figure the height of the contours, assuming the lowest to be 100′ above the datum level; make a section along the line of direction, showing H : B :: .6 : 1; shade the plan with stumping; draw on the plan a road having a gradient of 2° throughout.

129. Scale 12″ to 1 mile. Base AB is 700 yards long, B bearing magnetic east from A; AC is 550; BC, 730 yards long; the angle DAB is 40°; DBA, 80°; C and D are on the north side of AB; on the south of AB is a point $x$, at which the lines from A and C subtend an angle of 33°, whilst the lines from C and D subtend an angle of 45°; plot the triangulation. If variation be 18° west, what is the bearing of D from $x$ with reference to true north?

Assume a valley on the line $x$C, sloping down from $x$; suppose A to be the top of a hill of the same height as at $x$ and D; and B, the top of a hill one contour higher than A; sketch 3 contours, at any slopes, indicating such ground.

130. On an ordnance survey map, a road appears to have a bearing of 10° with true north; the prismatic compass shows the bearing with magnetic north to be 350°; what is the variation of the compass? How would you rule meridian lines on your paper so that your survey of this country might be joined on to the ordnance survey?

131. Standing at a certain spot, the bearings to a church, a tree, a house, the top of a hill, appear to be 340°, 20°, 195°, 80°, respectively; what angles are subtended, at any position, by lines to, the church and house,

tree and top of hill, church and top of hill, tree and house, respectively?

132. Why, on the prismatic compass card, are the figures inverted?

133. Why is the north point figured on the prismatic compass card as if it were the south point?

134. How are surveys made with theodolite or pocket sextant; what advantages and defects have these instruments, as compared with the prismatic compass, for surveying?

135. Why is the base the most important line in a survey?

136. What considerations guide the selection of a base?

137. How can surveys be made by linear measurements only; when is such method advisable; when unadvisable?

138. What are the advantages of commencing and finishing traverses at triangulation points?

139. Compare the advantages of making a survey by triangulation, and by traversing alone.

140. With the aid of a clinometer only, state how you would, practically, mark the contours on a military sketch of the adjacent slopes of two hills with intervening valley, if you had only time to go down one slope.

141. In pacing ground which slopes how would you act so as to determine with moderate accuracy the length to represent the plan of the sloping line?

142. With no other instrument than a straight-edge of wood having a scale on it, how would you fix on your

paper the relative position of 4 points in different directions?

143. With a straight-edge ruler, how would you conduct the traverse survey of a road running in a northerly direction, with successive bends to east, south-west, north-west, and south-east?

144. When making a sketch, without instruments, how would you fix the position of a point by interpolation?

145. What items of information should be conveyed by a reconnaissance report with sketch of a position?

146. Draw out a report with sketch of a road of 4 miles extent, either from memory of some portion of country or by imagination.

147. Explain method of eye-sketching as regards use of "back angle."

148. In surveying, without instruments, what is the object of adjusting the ruler on the back-station; and how does interpolation in this mode of sketching differ from interpolation in surveying with the compass?

149. How is the position of any object laid down on paper in eye-sketching without the assistance of any other appliance than a ruler or scale?

150. In making a reconnaissance of a road, what are the chief points on which you would report as respects its being kept in a proper condition?

151. In reconnoitring roads, state the calculations which should be made for estimating the supplies of "water," "hay," and standing "crops;" and also how an estimate is made of the temporary accommodation available for men and horses.

152. How would you calculate the number of men

who might be allotted for accommodation in a house occupied for one night during hostile manœuvres?

153. What space is required for each horse in a stable?

154. What is the weight of a cubic yard of old hay; and of straw?

155. A stack of hay is 12′ long, 10′ broad, 6′ high to eaves, and thence 6′ higher to ridge; what number of pounds does it contain?

156. A streamlet flows twenty feet per minute and is 2′ wide, 4″ deep; how many gallons of water may be obtained from it in 24 hours?

157. What amount of water is allowed for each man or horse, in calculating supplies required?

158. In the general observations upon a road, what items should be noted?

159. What notes should be made, in a reconnaissance report, concerning buildings, bridges, fords, ferries, soil, rivers, woods, marshes, defiles, positions, respectively?

160. What items of information should be contained in the reconnaissance of a river?

161. What are the ordinary acceptations of the meanings of "sluggish," and "rapid," streams, respectively, and, of a "torrent"?

162. Describe the plane-table, and its use.

163. What advantages are given by use of a plane-table instead of a prismatic compass, for surveying?

164. Describe the general principles in the construction and use of the Watkin range-finder; and state how you would use it to discover your range.

165. How can you ascertain your range by help of only a few pegs and a measuring tape ?

166. How by aid of prismatic compass and a scale, with pencil and paper, would you determine your range ?

167. At what rate does sound usually travel ?

168. What is the magnetic variation of the needle in England for the present year ?

169. Standing at a point R the following objects were placed relatively as under

| | | |
|---|---|---|
| L | 52° | 310 yards. |
| B | 160° | 484 „ |
| D | 258° | 196 „ |
| N | 279° | 233 „ |

Find the position of F, from which the bearings to N and L are 189° and 121°. Also of G, from which the bearings to D and B are 266° and 177°. State the angle and distance between F and G.

170. Construct a scale of 25 inches to a mile, in paces of 30 inches, reading to 300 paces.

171. Give the conventional signs for: "Site of battle," "Field artillery," "Vedette," "Direction of a patrol," "Military baggage," "Intrenchments."

172. Construct a scale of Turkish berris to use with a sketch where 560 berris are represented by 1·4 inches.

173. Show how to ascertain the distance across a river without any more accurate means of measurement than a few pegs and a tape.

174. What is the term applied to the angle which the true meridian makes with the magnetic meridian ? Should you wish to lay down these two meridians on a sketch you are about to commence, in a locality where

the direction of these meridians is unknown, how would you set about it?

175. What are the advantages derived from the use of contours for the delineation of hill forms.

176. Represent an imaginary sheet of water of an oval form, with a road running round it excepting where the water overflows and produces marshy ground; the basin being surrounded on three sides by rising ground. Two or three contours, showing a possible configuration for the ground, are to be inserted. The water, roads, and marshy ground, are to be coloured in the usual conventional manner.

177. Explain, in a succinct manner, the object of a triangulation; and give an example, on a scale of ½ inch to a mile, of a diagram of triangulation suitable for a military survey, to be laid down on a scale of 8 inches to a mile.

It is to be assumed that a greater part of the stations are invisible from the extremities of the base.

178. The angle of elevation of a tower 350 feet high, when due north of an observer, was 55° 30′, what will be the angle of elevation, when an observer has walked 700 feet due east on the horizontal plane? The question is to be solved by construction. The choice of scale is left to your judgment.

179. Two plans of the same ground are drawn; one on a scale of 1·2 inch to a mile; the other, 3 miles to an inch. Show the length of the line for each plan, which will represent 5½ miles. Give also the representative fraction for each of the scales.

180. Construct a triangle of which the side AB is 250 yards; of BC, 350; and AC, 520 yards; C bearing east from it. From the point *x* bearings are taken of 310° to A, and 33° to C. Find the distance of *x* from B, and the bearing of B from *x*; also show the direction of

the true north, assuming the magnetic variation to be 20° west.

*Scale* 100 *yards to an inch.*

181. An observer stands between two pillars, his feet being 90 feet in distance from the top of each. The one pillar being 60 feet, and the other, 54 feet in height: required the distance between the two pillars.

182. A surveyor finds the bearing of two known points to be 192° and 97°. Assuming that the second point is 1000 yards north-east of the first, what is the shortest distance from himself to a line between the two points ?

183. On pacing from the crest of a hill down a water-shed line, it is noticed that the slopes change at 48, 10, 8, 18, 11, 15, 40, 60, and at 120 yards; mark in, properly, the contours, and form lines, cutting the water-shed, number them, and enter the degrees of slope. Scale, 12 inches to a mile; and no gradient exceeding 20°. Gradients must be assumed at discretion.

184. Yorktown church spire bears 142°, and is a distance of half a mile from the college vane. What is the distance of the upper hospital from each of these points when the bearing from it to the college is 240°, and to the church 194° ?

185. Explain what you principally look for in the selection of points for triangulation, and illustrate your answer by a diagram, with the angles and distances given, on a scale of 6 inches to 1 mile.

186. If the "horizontal equivalents" taken from a "scale of shade" for 6 inches to a mile represent vertical intervals of 25 feet, what vertical intervals will they represent if the scale that you are surveying on is 18 inches to a mile? Give the reason for your answer.

187. Describe how you would arrange the shading of a knoll situated under higher ground.

188. Explain how the contours are established on your field sketches.

189. Supposing that you had been surveying for some time in one direction, what would you do in order to see if any error had unconsciously crept into the work? and how would the steps that you took effect this object?

190. State the present variation of the needle; and why it is necessary to lay it down on a finished sketch.

191. What is the principal difference in the method of conducting a road traverse in eye-sketching, and in road traversing with the prismatic compass?

192. A portion of survey, 3 inches square, scale 3 inches to 1 mile, contains the following detail:—

(i.) A river, average width 20 yards, flowing from N.E. to S.W.

(ii.) To the N. and W. of river an isolated hill (its general direction being parallel to the river) rises to an elevation of 230 feet above the river, the contours being at 50 feet vertical interval.

(iii.) A main road, 60 feet wide, crosses river by a brick bridge, and passes over lower slopes of hill at a gradient not exceeding $\frac{1}{20}$; general direction of road, from S.E. corner of sketch to N.W. corner.

(iv.) S.E. side of river is perfectly flat and interspersed with hedgerows and woods.

Make a sketch representing the above details, in accordance with the conventional signs, and show the true north point, the magnetic variation being 10° E.

193. In triangulation, what is meant by "well-conditioned triangles?" and why is it of the utmost importance that the base should be measured and laid down with the greatest accuracy?

194. Plot the following angles (not azimuth angles) and distances, on a scale of 8 inches to a mile:—

| | |
|---|---|
| Forward angle from A to B 305° | Distance A to B 1000 links. |
| „ „ „ B „ C 267° 30′ | „ B „ C 760 „ |
| „ „ „ C „ D 298° | „ C „ D 1200 „ |
| „ „ „ D „ E 320° | „ D „ E 550 „ |

A scale of yards *may* be used, assuming the above measurements to be in feet instead of links.

195. The compass reading of the zero-line in the above example being 35°, lay down the magnetic meridian and the true north line. Variation 22° west.

196. Construct a scale $\frac{1}{31680}$, to read furlongs.

197. In drawing sections, why is the natural scale used for the horizontal, but not for the vertical measurements?

198. Lay down the following triangulation; scale $\frac{1}{7920}$.

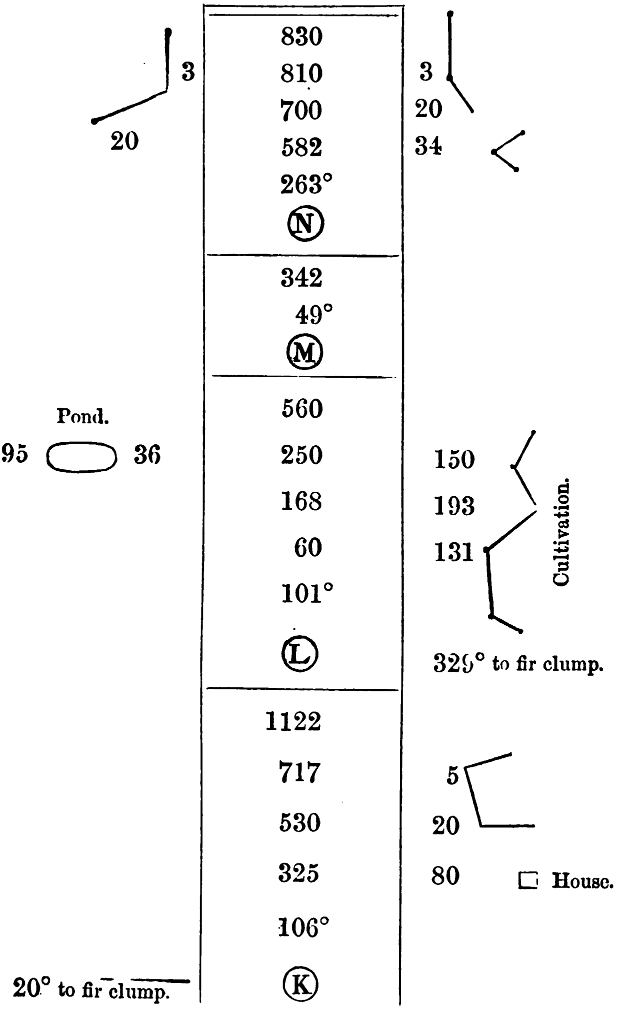
| | |
|---|---|
| Base A B is 790 yards in length. | At B bearing of G is 287° 30′ |
| At A bearing of B is 358° | „ „ „ E „ 64° 45′ |
| „ „ „ C „ 304° | „ „ „ D „ 126° 30′ |
| „ „ „ D „ 59° | At D „ „ E „ 346° 30′ |
| „ „ „ F „ 250° | At C „ „ G „ 345° |
| At B „ „ C „ 239° | „ „ „ F „ 197° |

What is the check-bearing from E to F?

199. Plot the accompanying field book to a scale of 12 inches to a mile; and state in writing the distances

and bearings from the centre of the bridge to the flag, and to the fir clump.

Stops on centre of bridge.



Begins at flag on common.

200. Plot the following bearings and distances of a traverse survey:—

| | Bearings. | Distances. |
|---|---|---|
| From A to B ...... | 140° 30' ...... | 320 yards. |
| „ B „ C ...... | 20° 0' ...... | 290 „ |
| „ C „ D ...... | 135° 30' ...... | 281 „ |
| „ D „ E ...... | 24° 0' ...... | 299 „ |

Find and note the bearing from A to E.

*Scale* 12 *inches to a mile.*

201. Give a neat example of the mode in which a field book is kept in recording the details of a traverse.

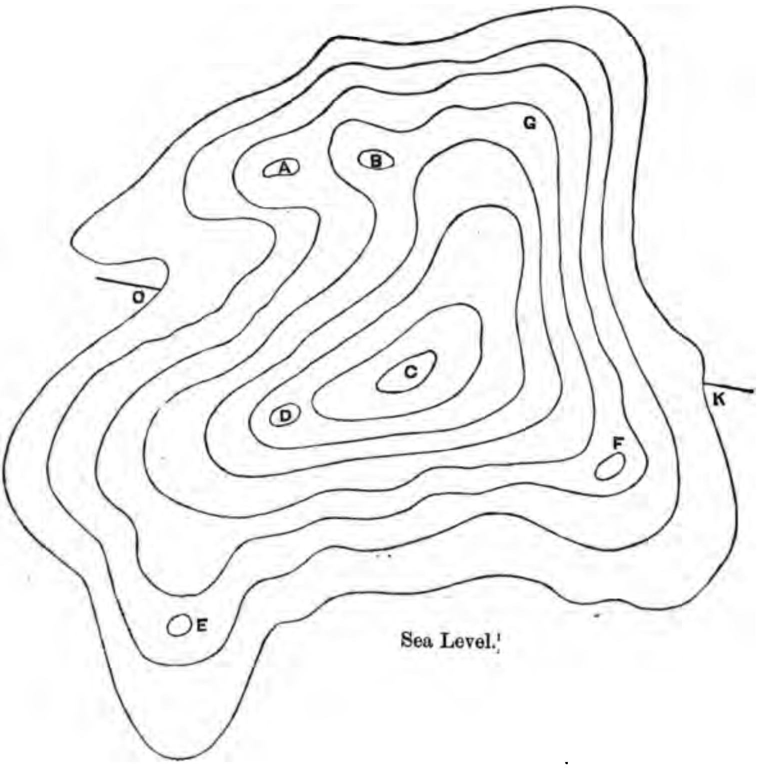
202. State succinctly what you consider to be the advantages of making a triangulation the basis of a survey; and explain, by reference to a diagram, how you would endeavour to secure accuracy in a hasty sketch, if your time does not admit of a preliminary determination of triangulation points.

203. Describe the different steps in copying a military drawing.

204. Draw the conventional signs for "main-road," "cross-road," "cultivated land," "sheet of water," "stone bridge," "embankment."

205. Lay down a line FG, 1200 yards, on a scale of 8 inches to a mile. From F, as a centre, describe five arcs cutting the line with radii of 0·9, 1·1, 1·4, 1·8, 2·5, inches; and from G, as centre, three arcs with radii 0·4", 1·0", 2·0". Consider the curves as portions of contours, and the point where the two series of curves approach nearest to one another as a col between two hills. Draw a section on the line FG under the following conditions: Contours 20 feet apart. Heights to distances as 5 to 1.

206. Construct a plain scale of 14 inches to a mile, showing 600 yards.



207. In the accompanying diagram:—

(*a*) The contours being at 10 feet vertical interval, and the scale 12 inches to one mile, what are the elevations, above the sea level, of A, B, C, D, E, F, and G?

(*b*) Supposing the vertical interval of the contours to be 12·5 feet and the scale 12 inches to one mile on line OK, mark the degree of slope between each contour.

(*c*) If the distance from O to K, in a direct line, were 1300 yards, what would be the scale of the diagram; and what would be the representative fraction of the scale?

208. Lay down a triangulation from the following data, to a scale of 12 inches to a mile, and state the length and azimuth angle of the check-bearing.

Base AB; length 550 yards; bearing 48°

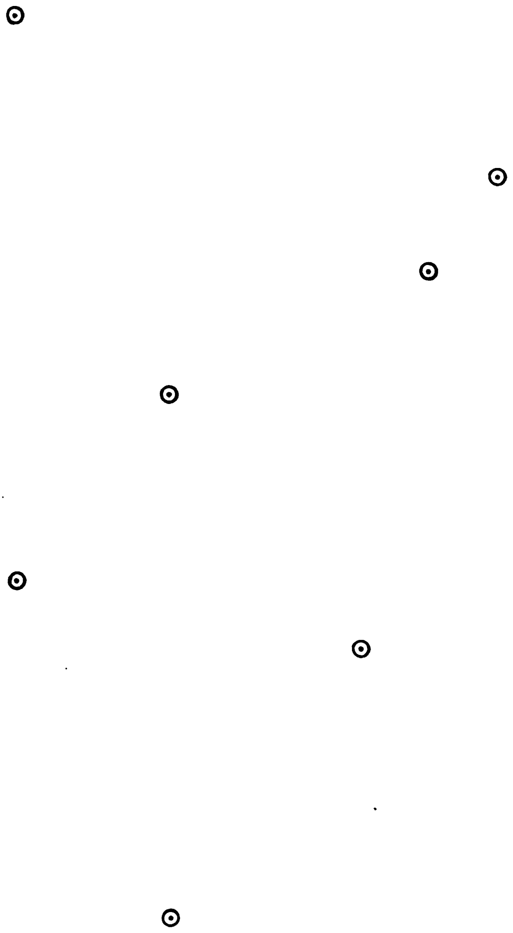
| | |
|---|---|
| Bearing from A to C ... ... ... | 76° |
| „ „ A „ F ... ... ... | 107° |
| „ „ A „ D ... ... ... | 345° |
| „ „ B „ E ... ... ... | 60° |
| „ „ B „ C ... ... ... | 119° |
| „ „ B „ D ... ... ... | 274° |
| „ „ C „ E ... ... ... | 352° |
| „ „ C „ F ... ... ... | 153° |
| „ „ D „ F ... ... ... | Check-bearing. |

Taking AC as a station line, and, beginning at the point A in that line, properly arrange the observations there given in a field book, and supplement them by 20 more entries relating to a road in traversing.

209. Explain, by the aid of a diagram, how, from a single "station line," passing through an open meadow, a road and a river would be surveyed. Let the road have three bends in it, and fall entirely on one side of the "station line;" and the river, with five bends, be on the other side of it.

210. Give the reasons for the conventional methods of making the following entries in a field book:—

The parallel lines down the centre of the page;
The entries being made in succession above each other;
The lines across the centre column;
The side entries in the outer columns;
The small circles in the centre column.



211. Seven conspicuous objects stand as above. Form a diagram for a good base and triangulation under these circumstances.

212. Lay down four points in a straight line, at any intervals, from west to east, two more in a line due

north of the second point, and one due south of the third and fourth points respectively. Form the best triangulation under these circumstances.

213. The crest line of a hill having been finished, lay down to scale the following observations, (made by compass, clinometer, and pacing) as near as possible along the orthogonal water-shed from one of the salients of the crest to a knoll below it; and show the shape of a small piece of each resulting contour.

| | | |
|---|---|---|
| From A to B | 65° | 80 yards. |
| „ B „ C | 40° | 120 „ |
| „ C „ D | 350° | 50 „ |
| Fall of 1 contour at | 15° slope. | |
| „ „ | 10° „ | |
| „ „ | 8° „ | |
| „ „ | 5° „ | |
| Level across the neck for fifty yards. | | |
| Rise of half contour | 4° slope. | |
| „ „ „ | 7° „ | |
| Rise of 1 contour to top of knoll, 10° slope. | | |

*Scale* 12 *inches to* 1 *mile.*

*Contours* 12½ *feet apart.*

214. The length of Cleopatra's Needle is reported to be 68 feet 6 inches. If a staff 6 feet in length, held up vertically beside it on level ground, casts a shadow of 3·75 feet, what would be the length of the shadow of the obelisk when the latter stood upright?

215. Given the following conditions:—

Base AB. Length 1000 yards
Bearing of B from A, 290°
C, due east of B, 350 yards
D, due north of B, 350 yards

E, due north of A, 600 yards
F, due south of B, 900 „
E cannot be seen from C or F.

Lay down the best series of triangulation under these circumstances.

*Scale* 6 *inches to a mile.*

216. Form the best triangulation from the following

points, noted in examining a piece of ground, half a mile square, with the view of making a field sketch.

Two posts due north-east and south-west of each other, marked F and M, the former being furthest north.

A house due south of F and east of M.

| | |
|---|---|
| **From the house ... ...** | Church spire bearing 70°.<br>Flag-staff, south-east.<br>Oak tree, south-west. |
| **From the flag-staff ...** | Church spire, north-east.<br>Cottage, bearing 150°.<br>Oak tree, west. |
| **From the church spire ...** | Cottage, south.<br>Post F, bearing 280°. |

Select the base under the supposition that the ground is tolerably level, can be freely measured, and that the distances between the points do not vary much.

*Scale* 8 *inches to* 1 *mile.*

# MILITARY LAW.

1. What is the necessity for having a code of military law?

2. Why cannot the army be governed under the provisions of civil law?

3. Why is Parliamentary sanction required, for the maintenance of a standing army, for the billeting of soldiers, for the trial and punishment of soldiers by courts-martial?

4. When is Parliamentary sanction given to Army Acts?

5. Besides those in the Army Acts, where are the other regulations to be found treating of the power of commanding officers as well as of minor details of discipline, enlistment, proceedings of courts-martial, etc.?

6. What are the meanings of the terms:—"Officer," "Warrant officer not holding an honorary commission," "Soldier," "Superior officer," "Regular forces," "Reserve forces," "Army reserve force," "Militia," "Militia reserve," "Auxiliary forces," "Volunteers," "Regiment," "Military decoration," "Military reward," "Enemy," "Colony," "Foreign country," "Beyond the seas," "Civil court," "Horse;" as used in the Army Act?

7. Into what five chief parts is the Army Act divided?

8. What are the offences in respect of military service punishable with death.

9. What offences in relation to the enemy are punishable with penal servitude ?

10. What offences are punishable with death on active service; and with cashiering or imprisonment when not on active service ?

11. What conditions constitute active service ?

12. What offences before the enemy are punishable with death, or with imprisonment, according to the intent of the offender ?

13. Is conviction of a crime necessarily followed by the penalty named for the offence in the Army Act ?

14. What is meant by the terms, " Mutiny," " Sedition," " Insubordination ? "

15. What four offences under the head of mutiny are punishable with death ?

16. What is meant by the term " In the execution of his office ? "

17. What are the penalties for striking, etc., a superior officer, under different circumstances ?

18. What are the penalties for disobedience of orders, under different circumstances ?

19. When must an officer obey an officer of inferior rank ?

20. What is the penalty for resistance to an escort, military or civil ?

21. Distinguish between desertion, fraudulent enlistment, and absence without leave.

22. What are the penalties for desertion, in different cases ?

23. What is the penalty for fraudulent enlistment when a man, on his first trial for such offence, is proved to have committed it twice ?

24. What is the penalty for not causing a deserter to be apprehended ?

25. For what offences, under the head of absence from duty without leave, can a soldier be tried ; and what is the penalty for them ?

26. What offences are classed under disgraceful conduct ? Which of them may be committed by an officer ? Which by a soldier or an officer ? Which by a soldier only ?

27. Does the term " Soldier " in the Act include a non-commissioned officer ?

28. What offence has a peremptory penalty, for which no less punishment can be awarded by a court-martial ?

29. What offences only may be charged as " disgraceful conduct " ?

30. What are the penalties for drunkenness, under the Army Act ?

31. What are the penalties, in different cases, for permitting the escape of a prisoner ?

32. What offences are classed under the head of irregular imprisonment ; and what is their penalty ?

33. What is meant by the expressions " in arrest or confinement ; " and what are the penalties for escaping therefrom ?

34. What are the offences, in relation to property, mentioned in the Army Act ; and their penalty ?

35. What are the penalties, in different cases, in relation to false documents and statements ?

36. What offences in relation to courts-martial may a witness be guilty of; and how are they punishable?

37. When can a court-martial punish a witness who is a soldier?

38. Define the crime called "Perjury." What is the penalty, under the Army Act, for perjury?

39. What are the penalties, under different circumstances, for offences in relation to billeting; and, in relation to impressment of carriages?

40. What constitutes enlistment?

41. For what offences, in relation to his enlistment, is a soldier liable to penal servitude; for what, imprisonment?

42. What offences by an enlister are punishable by imprisonment?

43. What offences are classed under the heading of "Miscellaneous;" and what are their penalties?

44. When, only, may a charge be framed as "conduct to the prejudice of military discipline?"

45. What civil offences are triable by military law? When may they be so tried? What are the penalties for them?

46. Can persons subject to military law be tried by civil law?

47. How may an officer act if he think himself wronged?

48. How may a soldier urge a complaint?

49. What penalty is incurred by a person making a misleading statement of complaint?

50. What is the scale of punishments by courts-martial, in the case of officers? What, in the case of soldiers?

51. When the sentence is one of penal servitude or imprisonment, what other sentence in the case of officers must, and in the case of non-commissioned officers should, precede this ?

52. What sentences may, and what may not, be combined, in the case of officers, in the case of soldiers ?

53. What is meant by the term, "Aggravated offence of drunkenness" ?

54. What "summary punishments" may be inflicted ? When ? Upon whom, only ?

55. What is meant by the term, "An offence of disgraceful conduct ?"

56. What Parliamentary check is kept on "summary punishments ?"

57. Can "summary punishments" be commuted to penal servitude ?

58. What is to be done when a person remains in arrest without trial for more than eight days ?

59. What is military custody ?

60. Who may order into custody an officer ? Who, a soldier ?

61. Can an officer or non-commissioned officer in charge of a guard refuse to keep in custody any person committed to him by an officer or non-commissioned officer ? What, in such case, is the duty of the commander of the guard ?

62. What is meant by the expression "commanding officer" ?

63. What powers, under Army Act and "Queen's Regulations," are vested in the commanding officer when dealing summarily with offences committed by non-commissioned officers and soldiers ?

64. What offences must; what, may; what, may not, be dealt with by commanding officer?

65. When may a soldier demand that evidences against him may be on oath, before commanding officer?

66. If an offender has been dealt with by commanding officer or civil court, can he be tried for the offence by court-martial? Does the converse agree with this rule?

67. When can a soldier appeal against the summary award of his commanding officer? Must he then be sent to any particular court-martial?

68. What is meant by "minor punishments"? When may such not be awarded? Is a non-commissioned officer subject to them?

69. What punishments by commanding officer are entered in the regimental defaulter book; what, in the company defaulter book?

70. Are fines regimental entries?

71. What are good conduct stripes, how earned, accompanied by what extra pay, how forfeited, how regained?

72. Who are not eligible for good conduct pay?

73. In the case of non-commissioned officers, what are ranks; and what, appointments?

74. To what extent may a commanding officer reduce the grade of a non-commissioned officer?

75. What is the criterion of well-established discipline?

76. How are first offences to be dealt with?

77. How are soldiers, and especially non-commissioned officers, to be treated by officers?

78. What is to be done, and by whom, if the statement or evidence, as to the offence by a person committed into custody of a guard, be not forthcoming at the expiration of 48 hours from the commitment?

79. How is an officer to act when in arrest? Can he demand a trial by court-martial when released without trial? Can a sentry be placed over an officer in arrest?

80. What may be done with a non-commissioned officer charged with a serious offence?

81. What is to be done with soldiers when charged with a minor offence, with a serious offence, when drunk?

82. What is a non-commissioned officer to do when he needs to confine a soldier?

83. How are soldiers to be treated, as to bedding, when they are in confinement for trial; and how, when in confinement pending inquiry?

84. State the steps to be taken, from the commencement of a soldier being brought before a commanding officer to the time when he appears before a regimental court-martial.

85. If prisoners are found, prior to going before the commanding officer, to be medically unfit for punishment, what is to be done?

86. If a commanding officer, investigating a case not of such a nature as he is empowered to deal with, desires to proceed with it, what should he, and what may he, do?

87. What "exemplary" conduct on the part of a soldier may free him from liability for trial for fraudulent enlistment?

88. If, for want of evidence, a charge before a com-

manding officer cannot be substantiated, and the prisoner is released, can he be re-arrested at a future time? Does the same rule hold good in cases of courts-martial?

89. When a commissioned officer's character or conduct as an officer and a gentleman has been impugned, what is his duty?

90. State the maximum award of punishment, (by imprisonment combined with confinement to barracks), which a commanding officer may give to a soldier.

91. What is punishment drill, its limit each day, the amount which goes with confinement to barracks?

92. What expressions are to be used in recording the characters of soldiers?

93. What powers of punishment may a commanding officer delegate to an officer commanding a company?

94. How are cases of drunkenness recorded in the company defaulter book; how, in the regimental defaulter book?

95. How are cases recorded when a commanding officer has reason to believe that a soldier was absent because drunk?

96. What is a commanding officer to do when a soldier has committed the offence of drunkenness as well as some other crime for which he is to be tried by court-martial?

97. Give the scale of fines to be levied by a commanding officer; and state how they are paid.

98. In computation of periods with regard to liabilities of soldiers for drunkenness, when are, and when are not, periods of absence under imprisonment or without leave to be reckoned?

99. What suggestions are laid down in the "Queen's Regulations" for guidance of officers as to the courts-

martial for, and the punishments of, offending soldiers ?

100. Are " stablemen," in the day time, responsible as "sentries " ?

101. Should minor offences be combined, as separate charges, with grave offences to be tried by court-martial ?

102. Distinguish between " Courts of inquiry," " Boards," " Courts-Martial."

103. What are " Military prisons," " Provost prisons " ?

104. Where does a soldier pass the term of imprisonment when sentenced to 168 days at home, to 672 abroad, to penal servitude ?

105. What is to be done with soldiers who, on embarkation, are under a sentence of imprisonment longer than the time on the voyage ?

106. When are soldiers discharged from prison ? What is done with them on the day of discharge ?

107. What escort should be sent to take charge of a deserter ?

108. Under whose charge are provost cells; by whom visited ?

109. State, in a tabular form, with regard to general, district, regimental, field general, summary, courts-martial, the rank of convening officer, the numbers, rank, and status, of members, the rank of president, the powers of the court.

110. May presidents of courts-martial be of lower rank than you have named ? When ? Of what ranks ?

111. May a court-martial consist of more, or of less, than the numbers you have mentioned ?

112. Is the president appointed by name? By whom? Is this also the case with members?

113. Must certain courts be convened to try certain crimes? How would the nature of the court be determined?

114. In what cases may the convening officer be president of a court-martial? May he confirm the sentence?

115. What are the rules with regard to the corps from which members may, or should, be taken?

116. Who may not sit as members, nor act as judge-advocate, on the trial of a prisoner?

117. What is done when a prisoner objects to a president or member?

118. Repeat the oath administered to president and members.

119. What other persons at a court-martial take certain oaths, and to what effects?

120. What is done when a court-martial is reduced below the legal minimum?

121. Can a court proceed if the president, or a member, be absent? Can such absent member take his place again if he was absent during a part of the proceedings?

122. When a court-martial has been dissolved, can the prisoner be arraigned before another court?

123. When has the president a second or casting vote?

124. What is the result of an equality of votes on the finding?

125. How does the court recommend a prisoner to mercy? Is such recommendation promulgated?

126. Who have powers to convene, and who to confirm, general, district, regimental, field general, summary courts-martial?

127. When can a court-martial be required to re-assemble after sentence has been recorded by it?

128. When a court-martial is re-assembled for revision of sentence, can it revise the finding? Can it ever take fresh evidence? Can it increase the sentence? Must all the members be present?

129. What are the rules as to promulgation and revision in cases of acquittal?

130. What is to be done when a member becomes confirming officer of courts-martial?

131. What different steps may a confirming officer take?

132. What confirmation is required for sentence of death, and for sentence of penal servitude, for civil offences committed in India or in a colony?

133. When, only, may summary courts-martial be convened? How are the sentences of such confirmed?

134. In what cases are convictions for certain less offences permissible, on charges of greater? What is the general rule on this point?

135. Distinguish between "Confirmed and approved," "Confirmed," "Not confirmed," "Mitigate," "Remit," "Pardon," "Quash," "Commute," with reference to proceedings of courts-martial; and state the effect in each case.

136. When can military prisoners be lodged in civil prisons; and by whose authority?

137. When, only, can a commanding officer remove a military prisoner from civil custody?

138. When does the term of penal servitude or imprisonment commence to reckon, in the case of sentence by a court-martial?

139. When a prisoner, already under sentence, is sentenced to another term of imprisonment by a court-martial, from what date does the second sentence reckon?

140. When a court-martial sentence has been revised, from what date does the revised sentence reckon?

141. A prisoner, under sentence of 336 days imprisonment, is brought before a court-martial after he has undergone 300 days imprisonment; what is the maximum amount of further imprisonment to which he can be subjected; and what term would be mentioned in such second sentence?

142. What power, under the Army Act, is assigned to the Sovereign, with regard to Articles of War; and with what limitations? What rules, under the Army Act, may be altered under hand of a Secretary of State?

143. Are civil courts required to recognize the proceedings of military tribunals? Prove your answer by references to the Army Act.

144. Can an officer be placed in command of another, superior in rank?

145. What is to be done in the case of certain prolonged absence of a soldier without leave?

146. What is the procedure when a soldier makes confession of desertion or fraudulent enlistment?

147. What is the purpose of a provost-marshal; his duties, and powers; where appointed?

148. What powers as to restitution of stolen property are vested in the authority confirming courts-martial?

**149. What term is the limit of original enlistment? how may conditions of service with such limit vary?**

150. When does a soldier commence to reckon service towards discharge; when does he forfeit any such service?

151. Distinguish between cases in which soldiers may forfeit service towards discharge; and when they may forfeit service towards good conduct pay, and pension on discharge.

152. Explain the meanings of the terms:—"Attestation," "Army Service," "Transfer to the Reserve," "Extension of Army Service," "Re-enlistment," "Re-engagement," "Service towards Pension," "Continuance in Army Service," "Old Soldier."

153. What is the daily rate of pay of an infantry recruit; what additions may he subsequently obtain by good conduct, and what by promotion to non-commissioned officer?

154. What is deferred pay, its amount, when issued, how forfeited? When is a soldier entitled to a pension; what is its amount?

155. Detail the proceedings for enlistment.

156. What are the regulations with regard to a soldier desiring to purchase his discharge?

157. In what different ways may the period of a soldier's service under his original enlistment be shortened?

158. What are the regulations with regard to the particular regiment in which a soldier is to serve?

159. What is meant by the term "General Service"? When may a soldier be subjected to it?

160. In what case, and for what periods, may

a soldier be retained in army service beyond the period of his enlistment?

161. When can a soldier be transferred to the reserve before the period fixed in his original enlistment?

162. What service may be required from militia, militia reserve, yeomanry, army reserve, volunteers, respectively?

163. Who can, and who cannot, act as justices of the peace for attestation of soldiers?

164. What are the rules with regard to enlistment of aliens, negroes, apprentices, boys, respectively?

165. What are the penalties, for false answers on attestation, if punished before, and if punished after, completion of enlistment?

166. What are the rules with regard to claims for discharge on the ground of invalidity of enlistment or re-engagement?

167. How do troops become entitled to billets on the march?

168. What civil authority arranges the houses for billets and the numbers to be billeted thereon? Who assigns the soldiers to their particular billets?

169. Upon what houses, only, may troops be billeted?

170. What accommodation and food is provided in billets for officers, for soldiers, and for horses, respectively; and at what cost?

171. When, and how, may the keeper of a house upon whom troops are billeted be relieved from such liability?

172. When should payments be made for billets and food?

173. How may routes be varied on the march?

174. What are the penalties upon officers, soldiers, constables, keepers of houses on whom troops are billeted, respectively, for offences in relation to billeting?

175. How are civilians to be dealt with who commit various offences before a court-martial?

176. Is a court-martial an "opencourt"? Explain this term.

177. In what respects are courts-martial ordered to conform to the rules in civil courts?

178. What are the provisions in the cases of trial of prisoners who are insane, or who were insane at the time of the commission of the offence?

179. For what period is a governor of any prison bound to keep a soldier in custody under order of the commanding officer?

180. What penal deductions from pay may be made in the case of officers, in the case of soldiers, respectively?

181. Distinguish between "Forfeitures," "Fines," "Stoppages."

182. What period, or conditions, of absence constitute a day's absence without leave?

183. What is the offence of "personation;" how punishable?

184. What are the exemptions of soldiers in respect of civil process?

185. What are the liabilities of officers and soldiers with regard to execution for private debts and legal actions?

186. What are the exemptions of officers and soldiers with regard to civil offices?

187. What are "Courts of request," where held, in what cases, how composed, with what powers?

188. What is to be done with a person in civil life who is reasonably suspected to be a deserter?

189. What are the penalties on trafficking in commissions?

190. What are the penalties for civilians purchasing from soldiers regimental necessaries, etc.?

191. What is the rule, as to liability to future trial, of a person subject to military law who has been tried by a court-martial?

192. For what military offences, and when, can a person, who has ceased to be subject to military law, be tried?

193. Can a soldier, offending in a colony, be tried in England? State the rule on this matter.

194. What is the liability to military law, in respect of time for trial of offences, after their being committed?

195. What adjustment of military and civil law is regulated, with regard to trials, by both, of same offence?

196. What is the penalty of an officer for neglecting or refusing to deliver a soldier into legal civil custody, or for obstructing civil ministers of justice?

197. Distinguish between parole and documentary evidence.

198. What documentary evidence is legalized under the Army Act?

199. Within what time, and before what courts, must civil actions for alleged offences in the execution of the Army Act be brought?

200. What are the regulations in the case of sick-

ness, etc., on the part of a soldier on furlough who is thus unable to return to his duty at the expiration of his leave?

201. Enumerate the persons subject to military law as officers, and those as soldiers, respectively.

202. What must be done before volunteers become subject to military law?

203. Give the special provisions as to punishment of warrant officers not holding honorary commissions.

204. Can a person subject to military law, but who is not a member of her Majesty's forces, be tried by a district, by a regimental court-martial, or by a commanding officer?

205. How are soldiers governed when on board ships in commission, on board hired transports, respectively?

206. What parts of the Army Act of 1881 apply, and when, to soldiers enlisted before 1879?

207. For how long does the Army Act continue in force?

208. Within what time should a commanding officer investigate offences charged?

209. What privileges has a soldier when charged with an offence before a commanding officer?

210. Within what time after investigation by commanding officer should a regimental court-martial be convened?

211. What is the procedure when summary of evidence is required on remand for trial? When is this summary needed? Can the prisoner demand a copy of it?

212. What are the rules with regard to reckoning of time of imprisonment inflicted by commanding officer?

213. What is a charge sheet?

214. Into what two parts should each charge be divided?

215. May a charge sheet contain more than one charge?

216. How does a charge sheet commence?

217. In what words should the offence be stated?

218. What should the particulars state?

219. When there is more than one charge, how may the particulars be framed?

220. When deduction from ordinary pay would form part of a sentence, what should be stated in the particulars?

221. What mistakes in the charge sheet would not affect its validity in certain cases?

222. What opportunities should be given for prisoner's preparation for defence?

223. When can prisoners be jointly arraigned? What exceptions may be made in this rule?

224. Detail the procedure of an officer on convening a court-martial?

225. What is the procedure when fewer members are present than were detailed in the order for assembly of a court-martial?

226. What officers are ineligible for serving on a court-martial?

227. What officers are disqualified for serving on a court-martial?

228. What is the first act on a court-martial; and what is the first duty of the court?

229. What is the procedure when the prisoner is

first before the court? To what persons has the prisoner no right to object?

230. Who adminster the various oaths?

231. What solemn declaration may be substituted for an oath?

232. Can more than one prisoner, when they are charged with separate offences, be present at the formation of the court; or is a court re-sworn for the trial of each prisoner?

233. When a prisoner is arraigned on several charges, how must his plea be recorded?

234. When can a court amend the charge sheet; and when can the court cause alteration in the charge?

235. When, and how, may a prisoner offer a special plea to the jurisdiction, or a plea in bar of trial? Does the decision of the court on such plea require confirmation? What special decision may the court record in such case; and how does the court then act?

236. If a prisoner refuses to plead, or does so not intelligibly, what plea is recorded?

237. What are the procedures immediately following a plea of guilty, in the cases of the different courts-martial?

238. Can a prisoner make a statement, or an address, after pleading guilty? What witnesses may he call in such case?

239. May a plea of "guilty" be afterwards withdrawn by a prisoner?

240. After a plea of "not guilty," what is the procedure up to the closing of the court for deliberation on the finding?

241. How are opinions of members taken on the findings?

242. What different expressions may be used in the findings?

243. Where the court are of opinion that the facts proved do not disclose an offence under the Army Act; or, if the court has a doubt on the point; what are the procedures?

244. What is the procedure on acquittal as to all charges?

245. What is the procedure subsequent to conviction; and how is the evidence then required given?

246. How does a court sentence an officer to forfeiture of seniority in rank?

247. When a prisoner has been convicted of several offences, does the court award sentence on each, or on all?

248. What is the procedure on recommendation to mercy?

249. How are the proceedings authenticated; how transmitted?

250. In the case of acquittal, when the confirming officer deems the case to require further attention, what is he to do, and not to do?

251. What can a confirming officer do when courts-martial require confirmation?

252. What is the procedure on revision?

253. When, only, is a court-martial sentence valid?

254. What parts of a court-martial are promulgated?

255. What is the confirming authority to do when he confirms the finding on only a portion of the charges?

256. When a sentence has been confirmed, and certain invalidity is found, what is the procedure?

257. What is the procedure as to confirmation of a special finding?

258. If a sentence be informally expressed, or is illegal in excess, what may the confirming authority do?

259. If the finding as to insanity of prisoner be not confirmed, can he be tried again for the offence?

260. In what order are members seated?

261. What are the duties, and the responsibilities, of the president?

262. What are the duties of the prosecutor?

263. What latitude is to be allowed to a prisoner on his trial?

264. What is the procedure when a prisoner is tried on separate charge sheets?

265. Who, only, may be present when the court is closed?

266. Who must always be present when the court is open? Does this rule apply when the court proceeds to view any place?

267. At what times, and on what days, may a court-martial sit? What exceptions may be made?

268. What adjournments may be made? What records are made in such cases?

269. When, only, can an officer be added to a court-martial?

270. What two separate functions are performed by members of a court-martial?

271. Must a member who voted in the minority for acquittal vote on the sentence? Why is this?

272. How is every question before the court to be determined? How are opinions taken?

273. What is the procedure when a question arises incidentally during the trial upon which prosecutor or prisoner requests the opinion of the court?

274. Who may act as interpreters or shorthand writers?

275. Can a court-martial take judicial notice of matters of notoriety? Explain what is meant by this.

276. What are the rules, with regard to a prosecutor's not calling all the witnesses whose evidence is in the summary; and, if he calls witnesses not mentioned therein?

277. How are witnesses procured?

278. What are the rules, with regard to a prosecutor who is a witness; and, as to the presence in court of other witnesses?

279. What oath or solemn declaration must be taken by every witness?

280. In what mode is evidence taken; how recorded?

281. How may evidence be tested?

282. When may witnesses be recalled at request of prosecutor or prisoner; when, by the court?

283. Who may assist a prisoner on his trial; and what are the rules in such case?

284. Who may act as counsel for prisoner?

285. When may counsel appear for prosecutor or prisoner?

286. What notice must be given as to counsel's appointment?

287. What rights of the prisoner and prosecutor merge in those of counsel?

288. When can prosecutor be sworn?

289. To what rules must counsel conform?

290. When can counsel not be objected to by prosecutor or prisoner?

291. What statement can be made by a prisoner assisted by counsel? Can the court or other person question him on this statement?

292. What is the order of addresses to a court-martial?

293. Who is responsible for the record of the proceedings? Can a refused question be noted therein?

294. Give all the items (12) enumerated in the statement, as to character and particulars of service of prisoner, which is produced to a court-martial after finding and before sentence.

295. By whom is this statement verified; and how?

296. What must be recorded in order to render valid the proceedings of courts-martial under the presidency of officers of exceptionally inferior rank, or composed of officers of different corps to those named in the regulation for ordinary cases?

297. In case of any alteration required to be made in the minutes of proceedings, how is it to be done, and how authenticated?

298. When should all witnesses be ordered out of court?

299. What information is to be given to a court, and when, in the case of a prisoner who has appealed from the award of his commanding officer?

300. What does a court-martial do with the charge sheet?

301. What is to be done when a prisoner or prosecutor declines to cross-examine a witness?

302. What is the procedure when a court desires to comment on anything before it, or to make report of any fact not forming part of the trial?

303. Who may inspect the proceedings during a certain part of the trial?

304. On their termination, to whom are the proceedings sent; what after course is taken with them?

305. What are the rules in case of the loss of the proceedings?

306. When must, and when may, a judge-advocate be appointed? Who can so act? Can he be changed during the trial?

307. State the powers and duties of a judge-advocate.

308. What rules as to rank and status of members do not apply to field general courts-martial; and, as to procedure?

309. When, and by whom, may a summary court martial be convened? What are the peculiarities as to its composition, procedure, powers, confirmation?

310. State the rules for summary punishment.

311. Draw out a schedule showing the items recorded by a summary court-martial upon a soldier, found drunk on his post, sentenced to the heaviest penalty, and whose sentence was changed by the confirming officer.

312. Distinguish between functions of courts-martial and courts of inquiry.

313. Who may convene a court of inquiry; what may be its composition; how is its action guided; can

it compel attendance of civil witnesses; is evidence before it taken on oath; does it record an opinion; who sign it; can its members serve on a court-martial on the same case?

314. What is to be done when a commanding officer forms an adverse opinion as to conduct of a subordinate in consequence of the assembling of a court of inquiry?

315. State the procedure of courts of inquiry as to illegal absence of a soldier, when held, how witnesses are examined, what declaration is made as to its conclusion, whether members are sworn, the result, what is done, by commanding officer, with the proceedings.

316. In the construction of rules under the Army Act, when are, and when are not, Sunday, Good Friday, Christmas Day, reckoned as part of the time mentioned?

317. Can charges be worded as, "making away with his arms, ammunition, or necessaries;" "making away with by pawning or selling his arms?" Give the rules about such cases.

318. How are the charges and statements of offence connected?

319. When may, and when may not, the expressions "near," "about," be used in framing charges?

320. When a prisoner is charged with conduct causing any pecuniary loss, what must be stated in the particulars?

321. When a man is to be tried for desertion and deficiency in kit, etc., should there be one or more charges?

322. What is meant by alternative charges; when should they be used; how are they dealt with in the finding?

323. When a prisoner is to be tried by court-martial after quitting the service how is he to be charged?

324. At Chatham Barracks, January 1st, 1880, as Sergeant-major A., of the 100th Regiment, was coming from roll-call at barracks, No. 131, Private D., of the same regiment rushed up to him and struck him with a loaded stick, saying, " I will have your life," or similar words. Frame a charge sheet for trial of Private D.

325. Frame a charge sheet for trial of following offence. On January 1st, 1880, No. 140, Private C., 96th Regiment, was awarded 14 days confinement to barracks by his commanding officer. On the 9th of January, 1880, he was absent from tattoo, and did not return until the following morning at 9 a.m.

326. Frame a charge sheet from the following summary of evidence: Constable A. states: "On the 10th of January, 1881, I was on duty at the docks, Liverpool. I saw the prisoner B. going on board a steamer then about to sail for New York; he was dressed in plain clothes; but, suspecting him to be a deserter, I apprehended him, and found in his possession a passenger's ticket for New York under the name of C."

Sergeant D., of the 100th Regiment, states: "I know the prisoner. I am colour-sergeant of his company; he had a furlough from the 1st of January to the 15th of February, 1881, to go to Ireland. On 31st December, 1880, I inspected his kit; it was complete. On the 12th of June he was brought under police escort to the barracks at Canterbury, dressed in plain clothes. The following articles of his kit, viz.: 1 tunic, 1 pair trousers, 1 pair boots, 1 great coat (issued spring, 1880), value 10*s*., 1 glengarry cap and badge, are still deficient."

327. No. 133, Private A., 68th Regiment, at Cork

barracks, when inspected in the ranks of the company to which he belongs, on commanding officer's parade, on 14th of October, was found to be drunk. Frame a charge sheet for his trial.

328. Frame a charge-sheet from the following statements : No. 1031, Private A., 38th Regiment. stationed at Cork, is reported absent from tattoo on 1st of June, 1880, remains absent, and is reported absent every day by the orderly sergeant of his company, till 24th of June, 1880. On the 24th, a court of inquiry is held. Evidence is taken as to absence and deficiency of kit; and, by it, he is declared a deserter from the 38th Regiment. On June 2nd, 1880, an inventory of kit was taken by the colour-sergeant of his company, and it was found deficient of the following articles : namely, 1 serge frock, value 10*s.* 7*d.*, a pair of boots, value 6*s.*; 1 great coat, value 11*s.*

He surrendered himself to the police in plain clothes, December 3rd, 1880.

329. Captain A., of the 10th Regiment, stationed at Aldershot, gave Colour-sergeant B. (of his company) a £10 Bank of England note, in order to get change at the bank, to pay his company on the 10th July, 1880 (money being required for pay and subsistence of his men on that day). Sergeant B. went to bank and did not return till the next day, when he said he had lost the money. Frame a charge sheet for his trial.

330. Frame a charge sheet against No. 607, Private A., 64th Regiment, stationed at the Royal Barracks, Dublin, in whose possession a silver watch, value £3, the property of No. 142, Private B., of the same regiment, was found. Private A. says that the watch was given to him by Private B., which is denied by Private B. Give a sufficient summary of evidence to substantiate the charge.

331. Frame a charge-sheet from the following evidence:—

Sergeant A., 100th Regiment, states: "Corporal D., 100th Regiment, was granted a furlough 1st November, 1880, to London, which expired on the 15th December, 1880; on that night I called the roll of the company to which the prisoner belongs, and found him absent. He has not since joined the company. On the 5th of January, 1881, I was in charge of the main guard at Chatham, when the prisoner was brought in, dressed in the uniform of the 5th Lancers."

Troop Sergeant-major C., 5th Lancers, states: "I produce the attestation paper of D., prisoner now before the court, by which it appears that he was enlisted in London for the 5th Lancers, on the 23rd November, 1880; and, on the 25th, I issued to him a free kit, valued at £5. He gave himself up as a deserter from the 100th on the 2nd January, 1881."

332. On what grounds may persons be incompetent to give evidence before a court-martial?

333. When can husband or wife give evidence against one another?

334. Would want of religious belief exculpate a perjurer?

335. When should objections to witnesses, as to incompetency, be raised?

336. In what ways can credibility of witnesses be tested?

337. How many witnesses are required to prove a fact? State the rules, and custom, on this point.

338. What are the meanings of the terms: "Evidence," "Proof," "Competent evidence," "Satisfactory evidence"?

339. State the five general rules as to the admissibility of evidence.

340. What is meant by the expression, "best possible evidence"?

341. When may documentary evidence be stronger proof than oral testimony?

342. What is the procedure when the best possible evidence cannot be produced?

343. What is the meaning of the term "hearsay"? Why can such not be accepted as evidence? What exceptions are there as to its exclusion?

344. Give instances in which evidence may be accepted as to the words or writings of a person not before the court.

345. What peculiarity is there as to the reception of evidence in cases of mutiny and conspiracy?

346. In what cases do courts-martial receive evidence not relevant to the charge?

347. What "presumptions" in law have always been held good as to innocence; and, intention?

348. State cases in which intention must be proved in order to ensure conviction.

349. State cases in which proof of the precise crime charged is not absolutely necessary in order to obtain conviction of offences punishable by courts-martial.

350. Distinguish between direct, (or positive), and circumstantial, evidence. Is the latter ever the best? Give an illustration.

351. On what depends the confidence to be placed in circumstantial evidence?

352. When are copies of public documents admissible as evidence?

353. How far, only, can private writings be admitted as evidence? When can copies of such be admitted?

354. When it is required to put in evidence the writing of a witness, or of a prisoner, what is the procedure?

355. When, only, are depositions generally admissible before courts-martial?

356. What evidence is required on reception of depositions?

357. When, and why, are dying declarations received as evidence?

358. Are confessions received as evidence? Are they, generally, sufficient? Does such confession implicate an accomplice?

359. What must be proved, to legalize the trial at the same time of several prisoners for the same offence?

360. In classifying offences defined by the Act, what principle has been adopted? Specify as many as you can of the general headings under which offences have been arranged, observing the order in which they stand.

361. Explain how the Act deals with offences the gravity of which is materially affected by the conditions and circumstances under which they are committed; and exemplify this by the provisions relative to acts of violence to, and disobedience of orders of, superior officers.

362. Explain the provisions of the Act for the punishment of "drunkenness" by a soldier; and also as to "drunkenness not on duty" being dealt with summarily by the commanding officer.

363. Name the different kinds of courts-martial by which a soldier may be tried, and the composition of each, if assembled at home.

364. State any regulations necessary to be observed

when a court-martial is re-assembled, and revises its finding on any one of its charges.

365. State, in brief terms, what summary of evidence you consider would be necessary to convict a soldier of the following offences; viz.:—

Absent from defaulter's drill on 4th June, 1879;
Deficient of two shirts;
Drunk in the streets on 4th of June, and resisting the picquet.

366. From what date does the imprisonment awarded by a court-martial commence to reckon? If any exception to the rule, state it.

367. What special provisions are made, with regard to the punishment of warrant officers, by the Army Act?

368. State fully the jurisdiction of a regimental, a district, and a general court-martial, respectively.

369. How should the summary punishment by a commanding officer (both over and under 7 days); by the civil power; and by court-martial, be recorded; and from when does each imprisonment reckon?

370. By whom are the witnesses before a court-martial examined, and how is their evidence taken? How is the presence of a civil or a military witness procured, either before or after the assembly of the court?

371. What do you understand by "Forcing a safeguard"? To what punishment is a person, subject to military law, liable, if he commits this offence?

372. Give in brief terms the summary punishments a commanding officer may award, in cases in which he does not deem it necessary to bring the man to trial by court-martial, when prisoner is a

(i.) Non-commissioned officer.
(ii.) Private soldier.

373. State which of such punishments awarded, either to non-commissioned officers or privates, entails a regimental entry.

374. A soldier disobeys the command of his superior officer. What features must appear in the case to render him liable, on conviction, to the sentence of death or penal servitude?

375. Explain how officers become empowered to convene general, district, and regimental, courts-martial, respectively.

376. Give in general terms the principles laid down in the rules of procedure for the framing of charges.

377. Private A. is in custody of an escort under Corporal B., proceeding to the guard-room by order of Sergeant C. He violently breaks away, and strikes Sergeant C. in the face. The escort then takes him to the guard-room. When there, he says, in Corporal B.'s presence, "If I had the stick which Sergeant C. had in his hand, I would knock his —— head off." Give the charge sheet for his trial.

378. What is meant by the "Summary of evidence" frequently mentioned in the rules of procedure? Under what circumstances, and how, is it prepared? What purposes does it serve?

379. Name as many as you can of the offences punishable with death under the Army Act, (*a*) committed under any circumstances; (*b*) committed when on active service.

380. Under what circumstances may a field general, and also a summary court-martial, be, respectively, convened.

381. Give, in brief terms, details of the origin of military law.

382. What are the general duties of the president of a court-martial when no judge-advocate is present? In the event of the president being unable, from any cause, to continue the trial after its commencement, what course must be pursued?

383. What courses are open to a commanding officer when investigating an alleged offence? A soldier has been absent without leave for twelve days, and returns with his clothing damaged and deficient of his waist-belt. Can his commanding officer deal with him summarily? If so, write his maximum award.

384. Private A., 120th Regiment, stationed at Aldershot, is absent at tattoo on the 15th March, 1881; he is discovered at Dublin, serving with the 130th Regiment, having enlisted therein on the 20th March, and having received a free kit, value £2. Frame a charge sheet for his trial by court martial.

385. State a summary of evidence which you consider necessary to substantiate the following charges against a soldier:—

(i.) Absent from defaulter's drill at 3 p.m. on the 4th of June;
(ii.) Drunk and riotous in the canteen at 4 p.m. same date;
(iii.) Kit deficient of 1 shirt and 1 pair socks.

386. Under what circumstances is it optional with a commanding officer to stop a soldier's pay for absence without leave; and under what circumstances has he no power of decision in the matter?

387. You are subaltern in command of a guard, and a soldier charged with an offence is handed over to you as a prisoner; what are your duties?

388. A soldier enlisted 1st January, 1880; was drunk on 1st April, 1880; 1st December, 1880; 2nd March, 1881; 3rd September, 1881; 4th September,

1882. He was absent for 7 hours on 1st May, 1880; 2nd May, 1881; 4th October, 1881. On 1st May, 1880, he was believed to have stayed away to get sober. State maximum penalties for each offence.

389. A soldier enlisted 1st January, 1880; absented himself 1st March, 1880, and was found on 1st January, 1881, serving in her Majesty's navy. For what offence can he be tried? What maximum penalties may he endure? Originally enlisted for 12 years' service, 6 to be with the army, when can he claim his being sent to the reserve; and when does his engagement expire?

390. When can a soldier be transferred from one regiment to another?

391. When can an offender against military law claim lapse of time since offence, in bar of trial by court-martial? What exceptions are there to the rules you state?

392. What are the gravest offences which soldiers can commit? What classes of offences rank next in gravity?

393. A picquet's chain of sentries having been forced by an enemy, in consequence of the drunken state of a sentry, what penalty attaches to that sentry?

394. If a prisoner be charged with theft, or desertion, or murder, of what lesser crimes of similar natures may he be found guilty by a court-martial?

395. A man who has been a soldier re-enlists, and suppresses certain information on the occasion, for which he renders himself liable to penal servitude. What information is this?

396. A soldier, in possession of three good conduct badges, is convicted by a regimental court-martial of some offence, and is sentenced to a short term of im-

prisonment. What are the consequences, in relation to his badges?

397. To what punishments are non-commissioned officers liable on conviction by court-martial? Write out the minimum sentences that a court may award.

398. How often may a court-martial be assembled for revision? State any description of evidence that, legally, may be received by a court on revision. When the finding is altered, but not the sentence, what form of procedure is to be observed?

399. Private A. enlisted 1st of January, 1865, incurs his first entry in regimental defaulter's book 13th of March, 1867; second entry, 1st February, 1871; third entry, 1st March, 1871; fourth entry, 1st January, 1876. Show the dates on which he became entitled to, or forfeited, any good conduct badges, up to the present date.

400. Write a short account of the origin and constitution of the army reserves, militia, militia reserve, yeomanry, and volunteer forces, respectively.

401. Upon what grounds might a man, offering himself as a recruit for the regular army, be rejected, although qualified as regards age, height, and chest measurement, and free from actual defect in a medical point of view?

402. Name some of the offences for which, if committed in relation to the enemy, the punishment of death may be awarded.

403. To what punishments are officers and soldiers liable, who commit the offence of drunkenness, whether on duty or not on duty?

404. You are in command of a small detachment at some distance from head-quarters. Private A. is brought a prisoner before you for having been absent

without leave; viz., from the 1st to midnight on the 4th of October, when he returned drunk; the act of drunkenness is over three and within six months.

His character is indifferent.

What punishment would you think it necessary to award him?

405. Private A. is brought before you as having been drunk in the streets. Sergeant B. states: "As I was coming into barracks last evening, a civilian whom I know, but who is not here, told me he saw the prisoner A. drunk in the streets." On such statements, could you, or could you not, award punishment? State reasons.

406. Give a summary of the evidence you consider would be necessary to substantiate charges of—

(i.) Absence from parade, at Gosport, at 10 a.m. on the 4th October, 1881;

(ii.) Insubordinate language to Sergeant A., at same place and date.

407. What is the regulation with regard to "prisoners exempt from duty;" for instance, in the case of a non-commissioned officer or soldier, who, having been placed in arrest or confinement, performed some duty or carried his arms?

408. What is the regulation as regards defaulters undergoing punishment, when any portion of it may have lapsed by reason of their being in hospital or employed on duty?

409. A soldier, (bad character), is convicted by a district court-martial of having been drunk, and making away with two shirts and a pair of socks.

Write out what you consider would be a proper sentence to meet the case.

410. In what manner does the Army Act limit the jurisdiction of regimental courts-martial?

411. A detachment of the line is stationed at a place where a militia battalion is assembled for training; is it legal to mix the officers in order to form a regimental court-martial to try a soldier of the line? Give rules on this matter.

412. Specify the full powers of punishment that a district court-martial possesses, in the case of a private soldier.

413. Under what circumstances, irrespective of the prisoner's right of challenge, is an officer disqualified from sitting on a court-martial?

414. What are the provisions of the Army Act relative to the offence of disobeying the command of a superior?

415. Private A. B. enlisted 1st of January, 1866, incurs his first entry in regimental defaulter's book on the 15th of January, 1868; second entry, 1st February, 1872; third entry, 1st March, 1872; fourth entry, 1st of January, 1877. Show any dates upon which he became entitled to, or forfeited, any good conduct badges.

416. Supposing a man, who has been atttested, is discovered to be an apprentice. State the conditions, as to his present age, the age at which he was bound, and the period for which he was bound, that would entitle his master to claim him. Explain the legal proceeding that would be necessary before he could be delivered up to his master.

417. Recite the questions that are put to a man upon going before a magistrate to be attested for the army; and state the penalty to which he becomes liable in case of making any wilful misstatement in his answers. In what case should the justice refuse to proceed with the attestation, though the man may have expressed his assent to the enlistment?

418. Set forth the powers of her Majesty, under the Army Act, for increasing the available strength of the army in case of imminent national danger, or of great emergency.

419. Private A. enlisted 1st June, 1879, was drunk for the first time 1st July, 1879; drunk, 1st August, 1879; drunk, 15th November, 1879; drunk, 20th December, 1879; drunk, 25th June, 1880; drunk, 1st May, 1881. State the maximum fine applicable to each case.

420. What cumulative powers of punishment are possessed by commanding officer, and by court-martial, respectively?

421. A man belonging to the 1st class army reserve, but not actually in military service, enlists into the regular forces. Explain how the provisions of the Army Act apply to this case for the purpose of punishing him.

422. Give a short explanation of the rule of evidence that "it is sufficient to prove the substance of the issue or charge."

423. Private A. is found drunk and creating a serious disturbance in barracks, during which he has violently struck Private B. with his rifle. He had been drunk a month ago, and also on two other previous occasions within the year. How may he be punished for the drunkenness? He is in any case to be tried by court-martial for the rest of the offence. Give a charge sheet.

424. Explain fully the state of the law as to applications of the president's casting vote, in decisions given by courts-martial.

425. What are the regulations with regard to the punishment of the offence of drunkenness when committed by a private soldier? When is it allowable for a commanding officer to add confinement to barracks to any fine he may impose?

426. What information should be given to a prisoner before being brought to trial; and what assistance should be rendered towards preparing his defence?

427. State fully the duties of a court-martial before it proceeds to the arraignment of the prisoner.

428. What should the confirming officer do if, in his opinion, the sentence were inadequate? What would be the result if a court-martial, during its proceedings, had admitted illegal evidence?

# TACTICS.

1. Distinguish between the terms, "Strategy" and "Tactics."

2. On what, mainly, does the success of an opposing army depend?

3. On what does moral superiority of armies depend?

4. When is one force said to be physically superior to another?

5. Explain the meaning of the term, "Mobility."

6. How far does mobility depend upon the soldier, individually?

7. What are the responsibilities of a commander to ensure mobility?

8. When, and why, do hostile forces move in disseminated order; and when, concentrated?

9. When two opposing armies have been moving, (disseminated), towards one another, from a distance, by what means may one of them gain advantage over the other?

10. What is the indispensable guarantee for success, and essential for the security of a force, with an enemy in opposition?

11. By what different means do hostile armies obtain information as to opponents?

12. How does an army guard its front when halted; and how, when on the march?

13. What are outposts, and their purposes?

14. What should be the extent of line guarded by outposts when an army has secured the position in its rear?

15. What difference would be caused in the extent of outpost line if it was to guard a small force isolated in a hostile country?

16. What sort of position would outposts usually occupy; and why?

17. When are outposts most advantageously formed of cavalry? Is infantry needed in such cases; and why?

18. When should outposts be formed of infantry; and why?

19. For what purpose is cavalry usually attached to an infantry outpost?

20. When is artillery needed at the outposts?

21. How is the strength of outposts regulated?

22. What considerations regulate the distances which outposts should be in front of the force they cover?

23. Name, in their order of position from front to rear, the component parts of outposts.

24. When an army halts on the march, what troops usually form the outposts? What exceptions are there to this method?

25. About what extent is the limit of the command of a *commander of the outposts?*

26. How should the extreme flanks of a chain of outposts be arranged?

27. What instructions should be given by the commander of the outposts to his subordinates?

28. About what extent of front should the sentries of one picquet occupy in the case of infantry; and, in the case of cavalry outposts?

29. When may the reserve of the outposts be dispensed with?

30. Should picquets and supports be furnished from the same battalions; and why? Does this rule apply also to the reserve; and why?

31. Is it best, as a general rule, to have a small number of large picquets, or a large number of small picquets?

32. What precepts should guide an officer detailed to command a picquet, from the commencement to the termination of his outpost duty?

33. At what period of the twenty-four hours are outposts relieved; and why?

34. How should a picquet move to the ground to be occupied?

35. How should an officer act on reaching the position to be occupied by his picquet?

36. How does an officer fix the position of each of his picquet sentries; and what instructions does he give the sentries?

37. Why should as few men as are necessary be employed as sentries?

38. What differences, in the position and distance apart of sentries, are there in open, or close, country; by day, or night, or foggy weather?

39. How many men are there on each sentry post; and what are their different duties?

40. When are men posted singly, as sentries with outposts?

41. What signals should advanced sentries be told to use?

42. For what length of time are men on sentry?

43. Should the same sentries occupy each post by day and night? Why?

44. As a general rule, would the line of sentry posts on a hill be shifted at night? Why?

45. How can a sentry at night know the precise directions in which, chiefly, to watch?

46. What is a sentry to do if approached, by one man from the enemy's side, by an enemy's patrol, by an officer not on outpost duty wishing to pass out through the sentry line?

47. How should a picquet and its sentries be posted, if in a wood; if in rear of a wood; if to guard the passage of a ford or bridge?

48. What is the use of an examining guard; where would it be posted?

49. When are connecting sentries, and when are detached posts, required?

50. How is it considered advisable, at night, to arrange the outposts, instead of the cordon system by day; and why?

51. On what considerations does the strength of a picquet depend?

52. About what strength should a picquet be if composed of infantry; and, if of cavalry?

53. What should be the strength of a picquet which has to supply three advanced sentries, one connecting

sentry, one sentry over the arms, and visiting patrols of a corporal with two men ?

54. About what distance should a picquet be in rear of its sentries, if of infantry ; if of cavalry ?

55. How should a visiting patrol move by day ; how, by night ?

56. From what portion of the outposts are reconnoitring patrols usually taken ? When is the most needful time in the twenty-four hours for them ? How should they act ?

57. When fires are permitted with outposts, what precautions should be used ?

58. When an attack during the night is probable, what arrangements should be made as to the men not on sentry or patrol duty ?

59. What arrangements as to watering, feeding, shifting saddles, should be made with a cavalry picquet ?

60. What should an officer do if a small body of the enemy tries to force its way through his sentry line ; and what, if he be attacked by a much superior force ?

61. When is the officer of a picquet justified in retiring with it ? How should he withdraw ?

62. In sending written reports from a picquet, what information should invariably be added ?

63. How many supports are generally needed ? What should be their strength ?

64. How far are infantry, and how far cavalry, supports behind their picquets ?

65. In sending out reconnoitring patrols, how should the men be selected ? What instructions should be given to the commander of the patrol ?

66. When the patrol system by night replaces the cordon, what considerations regulate the strength, the frequency, and the routes for such patrols ?

67. About of what strength should the reserve be ; and how composed ? About how far should it be from the picquets ?

68. What are inlying picquets, and their duties ?

69. About what total number of men are required on outpost duty to watch a front of one mile of moderately open country ?

70. What are the objects in reconnoitring ?

71. Which is the most useful arm for reconnoitring ?

72. How far in advance of an army can cavalry usually make reconnaissances ? How should they be supported if exposed to attack by enemy's infantry ?

73. What is meant by the terms : "Divisional cavalry," "Cavalry division" ?

74. About of what strength would the cavalry division be, employed reconnoitring in front of an army ? About what extent of front would it cover ? How would it be arranged ?

75. About of what strength should advanced patrols be if of cavalry ; if of infantry ?

76. What precautions should be taken by the commander of an advanced patrol of cavalry before starting ; how should he move ; how should he act when approaching a village, a wood, a bridge, or other defile by which he has to pass ?

77. What precautions should be taken by a cavalry patrol when it requires to halt for rest or feeding, etc. ?

78. What are the general rules, as to coming into

collision with an enemy, which should guide the plans of an officer commanding a cavalry patrol?

79. Enumerate the chief items of information which should be obtained by a cavalry patrol; and state how such should be conveyed.

80. What are videttes; and what are scouts?

81. What are the general purposes of small reconnoitring parties?

82. A reconnaissance in force is to be made; how should it act on reaching the enemy's outposts?

83. A non-commissioned officer with five men is sent to patrol ground about half a mile in front of the outposts. State precisely how he should move his party.

84. Why is it that on service troops are so frequently surprised by an enemy's attack?

85. Why is it absolutely impossible for a battalion to sensibly perform outpost duties when taken to them, for the first time, as a battalion?

86. How, alone, in time of peace, can you cause intelligent interest to be evoked in the practice of outpost duties?

87. Why is it so necessary that officers should understand the space and time required for troops in various formations?

88. How is the front and depth calculated for infantry when a battalion is in line, in quarter distance column, in column of fours, in column of companies?

89. What intervals are usually left between battalions in line, cavalry in regiments, artillery in field batteries?

90. At what rates do infantry advance, when marching in quick time; in double time; and on the march, including halts?

91. If a battalion consist of 8 companies of 100 men each, what, at home, will be its front in line; its front and depth in column of companies; its depth in quarter distance column?

92. At what time should a battalion start if to reach a place 20 miles distant at 1 p.m., allowing a halt of 40 minutes in the middle of the march?

93. What front and depth is allowed for each cavalry man on his horse; and what interval between the ranks?

94. How is the front and depth calculated for cavalry when the regiment is in line, in fours, in column of sections, in half sections?

95. At what rates does cavalry advance, at a walk, at a trot, on the march?

96. What are the fronts and depths of a regiment of cavalry of 8 troops, with 80 horses and men in each, when in line, in fours, in sections, in half sections?

97. If cavalry trot for a quarter of each hour, rest for 5 minutes, and walk the rest of each hour, when should they reach a place 12 miles distant from that from which they start at 6 a.m.?

98. What are the meanings of a "Field battery," a "Division," a "Subdivision," "Column of half batteries," "Column of divisions," "Column of subdivisions," "Column of route"? What front and depth is required for each formation if the battery has one line of waggons?

99. What interval is left between field batteries?

100. When guns are detached from a battery, what number should, for tactical reasons, be so sent?

101. When on the march, at what rate does field

artillery advance? If required to move at a trot, what is done with the gun detachments?

102. A division of an army consisting of 2 brigades of infantry (with 3 battalions, 800 strong, in each), 1 battalion, 600 strong, of rifles, 1 regiment, 600 sabres of cavalry, 3 field batteries with waggons, is drawn up in line; cavalry on right, artillery on left: what front does it occupy? If it moves to the right in column, cavalry in sections, infantry in fours, artillery in column of route, what will be the total depth of the column?

103. To what two results should the arrangements on a march tend?

104. What causes will, chiefly, affect the condition of soldiers at the end of a march?

105. In order to have men physically fit for marches, what attention should be given to their feet, socks, boots? At what times of the day should marches be performed? When should troops be halted on the road? How should the men be encouraged in cheerful endurance?

106. Marching in a hostile country, out of striking distance of enemy's army, how would the invading columns move? How would connection be maintained between the columns? When would a concentration of the force become necessary?

107. When an enemy is known to be in force in the proximity, how should the columns be formed, with regard to the three arms?

108. When a mixed force of cavalry, infantry, and artillery, preceded by an advanced guard, is marching near an enemy, what order would each arm occupy in the column; and why?

109. What are the advantages of marching troops

on a broad front? What width of road permits transport of waggons two abreast?

110. How should pace, and intervals, be arranged on a march?

111. What are the precautions to be taken as to villages and defiles to be passed through by troops on active service?

112. What tact must be used to permit relaxation to troops on the march without allowing their discipline to deteriorate?

113. What are flank marches? When are they dangerous; and why? What precautions should be used in making them? What is the most convenient formation for the troops making a flank march? How should it be performed as to time? Whereabouts should cavalry, and where artillery, move in such a case?

114. What are the inconveniences and dangers in a night march? When only should it be undertaken? What precautions should be taken in such a case?

115. What are the objects of the advanced guard of an army; its organization; its distance from the army?

116. What are the objects of the advanced guard of a division of an army? How are its duties, latterly, lessened? What proportions should it bear to the force it covers?

117. Into what two portions are large advanced guards divided? What are the duties of each?

118. In open country, about what strength per mile is needed for the most advanced patrols? How should they move in close country? How should they be supported?

119. About how far behind the vanguard is the main body of the advanced guard ?

120. What considerations determine the position for sappers; for artillery; and for cavalry; in an advanced guard ?

121. How should the flanks of an advanced guard be protected; and what arrangements should be made when there are defiles on or near the route ?

122. How should advanced guards act when meeting small parties of the enemy ?

123. What are the responsibilities of the commander of a large advanced guard when he reaches a superior force of the enemy ? For what reasons, though they were successful, was the conduct of German advanced guards in the Franco-German war contrary to the usual practice advisable ?

124. Hand-sketch an advanced guard consisting of 3 battalions, 1 cavalry regiment, 1 field battery; and mark the strengths and distances apart of the various portions.

125. Hand-sketch an advanced guard consisting of 1 battalion, 1 squadron, 2 field guns.

126. What are the characteristics of infantry, its arms, its adaptibility in war, its advantages as compared with the other arms ? State the similar items with regard to cavalry, and as to field artillery, and horse artillery.

127. Tactically, in what four ways, chiefly, is the form of ground of importance ?

128. What variations of ground, roads, etc., affect movements of troops ?

129. State, with reasons, the nature of country

most suitable for the action of infantry, of cavalry, of artillery.

130. What were the leading tactical principles of Frederick the Great in his attacks? Why were they then generally successful? Why would they now be unsuitable?

131. What tactical changes in attacks were made by Napoleon? When did his system fail; and why? Would his system be ever advisable now; if so, in what cases?

132. What were Wellington's chief tactical principles on the field of battle?

133. What changes in the employment of skirmishers have taken place in the last quarter of this century?

134. What is the vital principle which must always tend to the success of one army manœuvring against another?

135. What three points should be attained in formations for attack?

136. Into what three bodies are infantry generally divided when attacking infantry in position? What are the formations and distances apart of these bodies when 1500 yards, when 800 yards, when 300 yards, respectively, from the enemy?

137. What is meant by the expression "firing line"?

138. What is the interval between men skirmishing?

139. Why is it preferable that a battalion should form its own supports and reserves for its attacking skirmishers, instead of forming a skirmishing line supported by other battalions?

140. If a battalion of 800 men be formed for attack, what extent of front will it occupy? Why?

141. Up to what range should attacking infantry reserve their fire, usually; and why?

142. When must an attacking infantry expect first to suffer severely from an enemy's infantry? How should it advance thence?

143. When and how is the final assault given? If successful, what is the next paramount consideration?

144. Upon what principles are infantry arranged in the defence of an unfortified position?

145. Why is the strength of defenders now best arranged for shallower fronts and greater depths than formerly?

146. How far apart should the men be in the front line of defence? Why?

147. What is the use of the support? How far should it be behind the first line of defence?

148. What are the duties of the reserve? In what formations and at what positions is it wisest to keep the reserve until actively wanted?

149. A battalion 800 strong is to be one of the front lines of defence; how would you subdivide it; and how would you place each portion?

150. Upon what does the effect of a cavalry charge depend; and why must all cavalry movements be offensively conducted?

151. What formations for manœuvre, and what for charge, are most suitable for cavalry?

152. Why should cavalry charge be two deep and no deeper?

153. Why, invariably, should there be more than one line of cavalry charging? How should the rear lines advance?

154. What opportunities should be sought for cavalry charges ?

155. What nature of ground is most suitable for cavalry charging; and what, for its previous manœuvring?

156. Why should scouts reconnoitre the scene of cavalry action, fords, etc. ?

157. What are the weak parts in cavalry charging ; and at what times are cavalry least capable of self-defence ?

158. At what pace should cavalry advance to the charge ?

159. When and how should cavalry attack cavalry, infantry, artillery, respectively ?

160. What is the difference, in use of arms and in equipment, between cavalry on the field of battle, and when engaged in reconnoitring in front of an army ?

161. Why are cavalry soldiers now needed to be, individually, intelligent ?

162. Why are mounted infantry now so much needed in warfare ?

163. What special powers and weak points has field artillery ?

164. What missiles are employed from field guns ? What are the best opportunities for each ?

165. What nature of position is most suitable for artillery ?

166. How is concentration of artillery fire obtained ? Of what is its value ?

167. Explain the following terms with regard to fire : " Oblique," " Frontal " (formerly called " Direct "),

"Cross," "Flanking," "Enfilade," "Curved," "Reverse," "Ricochet," "Grazing," "Direct," "High angled," "Plunging."

168. Why should artillery in action be rarely moved?

169. Why should an escort accompany field guns? When should the escort be of cavalry; when, of infantry?

170. Why should the waggons, and, if possible, the limbers, be sheltered from an enemy's fire?

171. From the commencement to the close of a battle, what are chief functions of artillery, of cavalry, of infantry?

172. What precept determines the mark for artillery fire during a battle?

173. When should artillery change position?

174. When would artillery not reply to an assailant's guns?

175. When an army, occupying a position, receives attack, what measures to defeat it are taken by the artillery, by the cavalry, and by the infantry of the defenders?

176. How should defenders occupying a position assure knowledge of ranges; and how, obtain information as to enemy?

177. What is meant by the term "Counter-attack"?

178. What advantages over an opponent should be gained by the force which remains on its position for twelve hours before receiving attack?

179. In order to defeat an attacking enemy, what

must be done besides foiling his assaults? How should troops be economized to enable such defeat?

180. Enumerate the ten chief items which form a good defensive position.

181. Why is it best that the line of communication to the rear of an army should run from near its centre somewhat perpendicular to the line of the army receiving attack?

182. What nature of country (with regard to its hills and other natural features, villages for occupation, etc.) is most suitable for defence by an army?

183. An army on the defence disposes its troops in several lines; what are the purposes of the rear lines?

184. Distinguish between "Special reserve," and "Local reserve." State the uses for each.

185. What are the two chief requirements in the present day which must be provided for by a commander of a force on the defence?

186. Why are echelon formations so suitable in defence?

187. How is the commander of a defending force likely to be misled by an enemy's feint of attack? How should he ascertain the state of the case, and how, provide for it?

188. When and how should counter-attacks be made?

189. What advantages attach to an army on the defensive?

190. What is the final course sought by an attacking force in order to produce a decisive effect; and by what means does an assailant endeavour to attain it?

191. What would an assailant now prefer to a front attack; and how would he obtain his desire?

192. When an assailant has succeeded in taking the first line of defence, how should he act in order to hold it and press onwards?

193. How does an assailant deceive his opponent as to his intended point of attack?

194. In what depth would formations be for real attack, for feigned attack?

195. When should an assailant use his special reserve?

196. Of what uses are local reserves, in attack?

197. Enumerate the eight special points for attention in attacking a force.

198. What advantages accrue to the attack?

199. What are the duties of the rear-guard of an advancing force? What, of a retreating force?

200. How is it that a comparatively small rear-guard can hinder the pursuit of an enemy which has already defeated the larger main body retiring?

201. Why is the action of a rear-guard retiring necessarily less bold than that of an advanced guard?

202. How does such a rear-guard gain its object? What should it do if pursuit ceases?

203. What is the composition of a rear-guard; and how are the different arms utilized?

204. How does a rear-guard prevent its being turned.

205. When the retiring main body has to pass a defile, what must the rear-guard do?

206. What is the order of march of a rear-guard?

207. What distance should a rear-guard be from its

main body? What support may it expect from the latter?

208. When, only, should a rear-guard destroy bridges and other communications behind it?

209. When, only, is a river a formidable barrier between opposing armies?

210. When a river forms a considerable length of the front defended, how should its passage be guarded?

211. What means should a defender obtain, and how, if he is to actively prevent the passage of a river?

212. If the points open to an enemy's passage be too numerous to defend, how should an army behind a river act?

213. Supposing that 10,000 men were available for the defence of 10 miles of river frontage, how might they be disposed so as to check the enemy's head of advance, and to meet him in force as quickly as possible?

214. What steps would you take to force the passage of a bridge?

215. Where and when would you establish a covering party, when forcing the passage of a river?

216. Where are the best, (tactically), positions for forcing the passage of a river?

217. What strategetical considerations may determine the locality for crossing a river, to attack an enemy behind it?

218. In forcing the passage of a river, how will the nature of the banks, the cover on each bank, the approaches to the point of crossing, affect your choice of locality?

219. How will this operation be assisted by tributary streams, wooded islands, open ground on enemy's side, cover on enemy's side?

220. An army has to force the passage of a river behind which lies an enemy who has constructed bridge-heads. State, shortly, the dispositions of the assailant to effect his purpose.

221. What is the meaning of the term "Defile"?

222. Of what value to a force of inferior numbers is the occupation of a defile for defence?

223. When does the defence of a defile become valueless?

224. Compare the value of defence, in front of a defile, in a defile, and in rear of a defile; and state the circumstances under which each case is most suitable.

225. As commander of a rear-guard having to retire through a defile, how will you arrange?

226. How would you arrange troops and guns for defence of a defile from its rear?

227. How would you turn a defile?

228. If forced to attack a defile, how would you do it?

229. From which side would you defend a bridge not covered by a bridge-head; and why?

230. How would you arrange for the defence of a ford?

231. What depths are fordable by infantry, by artillery, by cavalry?

232. When forcing a ford, in what order would you send each of the three arms?

233. What indications would you seek for fords? Which parts of a river with bends are most likely to be fordable?

234. How would you defend a causeway across a marsh?

235. What advantages do villages afford as defensible posts?

236. In what cases would defence of a village be advisable?

237. Why does the power of resistance from a fortified village depend so greatly upon its communication with the rear?

238. Enumerate, in their order of importance, the steps you would take in preparing a village for defence.

239. How would you apportion your troops for defence of a village?

240. During an enemy's artillery fire on a village, how would you dispose your infantry; and how, your artillery in the village?

241. When the village forms an isolated post, how would you place the artillery defending it? What difference in the position of the artillery would you make if the village formed part of a defended position?

242. In what different ways may the defence of a village be overcome?

243. If the assault of a village be necessary, how would you undertake it?

244. Having obtained possession of a village, what steps should be immediately taken?

245. What advantages do woods afford to a defender?

246. Why should a defended wood be wholly, not partially, held?

247. What disadvantages are there in defence of a wood?

248. In reconnoitring a wood to be defended, what are the chief points to note?

249. Where, chiefly, should a wood be defended; and where would be the rear line of defence?

250. How would you use artillery, and how cavalry, in defending a wood?

251. How would you overcome resistance from defenders in a wood?

252. When assaulting a wood, how should artillery be used?

253. When a wood is taken, what is the next step?

254. What is meant by the expression, "convoy"?

255. What are the cases in which convoys are necessary; and what differences are there in the composition of each?

256. What should be the limit of the length of a convoy; and why?

257. Whereabouts in a convoy would you place pack animals; and where, wheeled carriages? In what formation should they advance on a road 20 feet wide?

258. What precautions, before starting, would you take to prevent trouble from accidents to carriages, etc.?

259. When a convoy halts to feed, how would you arrange it?

260. How would you utilize the infantry, and how the cavalry, escort?

261. What are the duties of the cavalry escort? About how far should it be from the convoy?

262. What proportion of soldiers to prisoners, in a convoy, is needed as a guard?

263. When an enemy is signalled as advancing in force, how should the waggons of the convoy be arranged?

264. What precaution should be taken when a convoy has to pass through a defile?

265. If there be no time for regular parking, how should resistance be arranged?

266. What opportunities would you seek for attack of a convoy?

267. What would be a wise proportion of the three arms in a force sent to attack a convoy?

268. What are the most vulnerable parts of a convoy in open country; in close country?

269. When a convoy has parked, to resist you, what action would you take?

270. How would you assault a convoy in motion?

271. In command of a convoy by water, where would you place your infantry escort; and where, the cavalry?

272. If the convoyed boats are being towed, where would you place a portion of your infantry escort?

273. How would you retain connection between the cavalry escort and the boats?

274. When a convoy by water is attacked from one bank, where would the infantry, and where the convoy, proceed?

275. Sent to attack a convoy by water, how would you act?

276. What were the chief tactical lessons taught by the actions in the Russo-Turkish war?

277. Up to what range was there severe loss from infantry fire? What is the natural deduction as to fire discipline?

278. In this last war, how was it that the artillery failed to produce good effect from its preliminary fire?

279. Why is head-cover for defenders of works now so necessary? How is it to be obtained?

280. In a frontal attack, what was found to be indispensable to enable the assailant to reach the defenders of a position?

281. Why have fire tactics superseded shock tactics?

282. How did Skobeloff arrange his troops for assaults? How did he hold the defenders whilst gaining their flanks? At what periods did he use his reserve?

283. How should a body of cavalry be formed for attack; and why should it be so formed? Give any instances that you may remember where neglect of this formation caused disaster.

284. A small advanced scouting party having seen a force of the enemy in movement, the non-commissioned officer in charge, when reporting the circumstance to the officer commanding, stated that he had been able to time them passing a certain point, with the following result: First, a party of cavalry went by in sections at a trot, and took about 1 minute 12 seconds to pass. Then a body of infantry, moving in fours, took about 15 minutes passing the same spot. They were followed by what was evidently a complete battery of field artillery. On sending back his report, what numbers should the officer in charge of the reconnaissance assign to this force? Give your calculations.

285. State some of the circumstances which would influence the distance between the advanced guard and the head of the army it is covering.

286. You are in command of a cavalry reconnoitring party, and

(*a*) You find it necessary to halt for rest and feeding in the day time.

(*b*) Your road runs through a large wood.

How would you act in each case?

287. In what way is the order of march of an army in the field regulated, as regards the precedence of the different arms?

As a general rule, where should the artillery of an advanced guard, and of a division, be placed on the march?

Supposing that a division is kept in reserve during an action, should its artillery be necessarily kept with it? Give your reasons for your answer to the above three questions.

288. What are the objects at which formations of infantry for attack should aim, under the following circumstances:—

(*a*) When directed against well-armed and disciplined troops, such as armies of Europe.
(*b*) When directed against brave and numerous, but badly armed and badly disciplined, masses, such as Zulu Caffres.

289. Name the different kinds of projectiles used by field artillery; and explain the circumstances under which each is most suitable. What considerations determine the limits of range for each?

290. How may the utility of guns be affected by the nature of the ground on which they are placed?

291. How should the escort of a convoy be distributed on the march? If suddenly attacked and there is not time to park the convoy, what is the best formation to be adopted for the carriages? Give your reasons.

292. In selecting a spot at which to force the passage of a river, what local features would you look for; and for what reasons?

293. What is the "tactical unit" of an army? Give the composition and strength of the British tactical unit.

294. In all armies of civilized nations the infantry arm greatly preponderates. Why is this?

295. At what objects and range would shrapnel, or segment shell, and case shot be, respectively, used by artillery in action?

296. What are the two systems of outposts referred to in the "Field Exercise"? Explain their objects; and state the circumstances under which they would be adopted, separately, or in combination.

297. As an officer in command of a picquet in the vicinity of the enemy, what alterations in the posting of your sentries, and in the employment of your patrols by day, and by night, would you deem necessary? Describe them in detail.

298. You are sent in charge of a small reconnoitring party, with orders to get as close to the enemy's position as possible, to examine the ground, and to report how it is occupied. State the manner in which you would proceed to carry out the order, and what are the points of most importance to observe and note.

299. Calculate the time it would take for a division of our arm (war strength) to pass a certain point, the rate of marching for all arms being three miles an hour; the infantry marching in fours, the cavalry in sections, and the artillery in column of route; the usual intervals to be allowed for, but the baggage, ammunition, and hospital trains not to be included. Show your calculations.

300. For what purposes are advanced guards formed? On what considerations are their strength and composition determined? How should an advanced guard (infantry) act under the following circumstances:—

(1) On approaching a village;
(2) On entering a defile;
(3) On arriving at an open plain?

301. Briefly describe the characteristics of the three arms, and show in what manner each is influenced by the nature of the ground.

302. What is meant by the "power of concentration of an army;" and on what conditions does it depend?

303. What cirumstances determine the composition and strength of the force necessary for outpost duty, and also the position of the outposts as regards the main body?

304. What points would you specially note if sent to reconnoitre an enemy's position with a view to attack it?

305. Assume any probable rate of march, and calculate the time a force of the three arms (strength as below) would take to pass a certain point:—

Infantry: 7 battalions, each 1000 strong, in fours;
Cavalry: 1 regiment, 450 strong, in sections;
Artillery: 3 batteries with waggons, in column of route.

One-sixth may be allowed for straggling.

306. Whilst moving in command of a small reconnoitring party, you discover a force of the enemy on the march. What action would you take under the circumstances?

307. What should be the ordinary rate of marching per hour of infantry, cavalry, and artillery, respectively, not including halts, the whole at the walk; and what are the different circumstances which may tend to reduce these rates?

308. The advanced guard of an army moving in an enemy's country has to pass through a mountain defile or pass, with accessible heights on either side. How should this be done?

309. A force of 2 battalions of infantry, on war strength, 2 batteries of artillery, and 1 regiment of cavalry, is moving in the order, as mentioned, along a road; infantry in fours, artillery in column of route, cavalry in half sections. What is the length of the column?

310. What precautions have to be attended to in executing an ordinary march, a flank march, and a night march in an enemy's country?

311. What is the armament of cavalry? What work, therefore, might it be expected to execute; and what ground would be most suitable for its effective operation?

312. Compare the tactical systems of Frederick and Napoleon, illustrating your answer by examples.

313. What nature of ground should, if possible, be selected for the general front of a line of outposts? Give reasons for your answer.

314. What do you understand by the mobility of an army, and on what does it depend? How may this mobility be increased in the case of an army moving (*a*) through a hostile country; (*b*) through a friendly country?

315. How would an English battalion on war strength be distributed as outposts (*a*) in the case of a small force; (*b*) in that of a large one? What extent of front would it cover in each case?

316. What is the usual strength for a picquet? What duties must the officer commanding it, and the force he commands, perform? Describe how you would tell off a picquet of 50 men.

317. What should a picquet do in case of attack by day, and by night? When, in either case, should it fall back?

318. Describe fully the different classes of patrols used on outpost duty. Specify their several duties, their strength, how often sent, and the extent of ground to be examined by each, both by day and by night.

319. In defending a position, counter-attacks are said to be "the life of the defence." Explain the reason; and state generally how they should be conducted.

320. Describe the manner in which a charge of cavalry should be conducted, and what precaution should always be taken before the charge is made.

321. What are the advantages and disadvantages of artillery fire as compared with musketry fire? What different kinds of projectiles are used by field artillery in action?

322. In forcing the passage of a river, what is the object of the covering party? State generally the work it would have to do.

323. An army is constrained to make a flank march. Three parallel roads are available. The enemy are within striking distance on the right flank. Describe the dispositions you would make for the march of the columns, and any other precautions you would take.

324. What is the general mode of action that should be adopted by the rear-guard of a retreating force which is being pursued? Illustrate your answer by referring to a notable instance in the Peninsular war of a rear-guard successfully retarding a pursuing force under Wellington.

325. What is the most suitable description of country for infantry attacking, for infantry defending, and for cavalry attacking? Give the reasons for your answer.

326. In attempting to effect the passage of a river

which is defended, what tactical considerations would influence you in selecting the actual point of crossing, when the general locality for crossing had been determined?

327. In the defence of a wood of large extent, where would you post your guns? Give the reasons for your answer.

328. In selecting a position for defence by infantry, what do you consider are the two most important advantages that well chosen ground should afford? State reasons for your answer.

329. Mention the chief characteristics of each of the three arms of the service. With what weapons are they severally armed?

330. Describe, as laid down in the "Infantry Field Exercise," the formation of a battalion of the first line, when extended for attack, at about 2000 yards from the enemy's position. Describe the changes which take place in this formation, from the time of its being assumed up to the moment of closing with the enemy.

331. Where, as regards the guns, should the escort of a battery of artillery, in position, be placed:—
(1) Supposing it to be composed of cavalry?
(2) Supposing it to be composed of infantry?

332. A combined force of three arms is ordered to attack an entrenched position. Describe the part ordinarily taken by each in preparing for, and in carrying out, the attack.

333. Define a "Defile," in the military sense of the word. Mention some of the different sorts of defiles.

334. What are the considerations which would influence you in determining on the manner in which you would defend a defile?

335. What are the chief points to be noted with regard to a wood which it is proposed to occupy for defence? Describe the manner in which you would proceed to place a wood in a state of defence.

336. Of what arms of the service are the outposts of an army generally composed? What proportion, approximately, should the troops on outpost duty bear to the force they are covering?

337. What are the different bodies into which the troops on outpost duty are divided? How are they posted relatively to each other; and what are their respective duties?

338. With what objects are small reconnoitring parties ordinarily used? You are sent forward with 6 troopers to reconnoitre an enemy's position, explain how you would proceed to get close enough to the position to do so, and what points in connection with the position you would observe and report upon.

339. What is the normal composition of an English division of the three arms?

Assuming a cavalry regiment to be 400 strong (in 4 squadrons), and an infantry regiment to be 800 strong (in 8 companies), what space will a division require in order to deploy into line, the artillery being on the right, and the cavalry on the left of the line? Show your calculations.

340. Explain, with the aid of a rough diagram, the formation in which an advanced guard, strength as below, should move along a road in an enclosed country, marking on the diagram the distances between the several parts of the advanced guard.

Strength of advanced guard
1 battalion of infantry.
1 squadron of cavalry.
3 guns.
1 company engineers.

341. What considerations determine the distance by which an advanced guard should precede the force it is covering?

342. You are directed to hold a wood with a small force of the three arms. State, generally, what steps you would take to strengthen it, and how you would dispose your troops. Give your reasons.

343. Describe in detail the duties of, and points to be borne in mind by, an officer commanding an infantry picquet, from the moment he is warned for that duty until he is relieved from it.

344. Describe the different kinds of infantry patrols; their composition, objects, and duties. From what bodies are they furnished?

345. With what objects are small reconnoitring parties of cavalry used? Of what strength should they consist? What should be their order of march; and what are the general principles that should guide their action with a view to accomplish their objects?

346. You are given command of two companies as an advanced guard. State how you would dispose of them under the following circumstances:—

(*a*) While marching along a road through enclosed country;
(*b*) When reaching an open plain;
(*c*) When approaching a village;
(*d*) On ascertaining that the village is occupied by the enemy.

347. Describe briefly the tactical systems of Frederick, Napoleon, and Wellington; and trace the influence of breech-loading fire in establishing the infantry tactics now in vogue.

348. What are the chief points to which the commander of a picquet should direct his attention in

marching to the ground assigned to him; on arrival there; and in posting his sentries?

349. In what respects should the distribution of picquets and sentries differ by day, and by night, respectively; and for what reasons?

350. What are the advantages and disadvantages of utilizing many roads for the march of an army; and how would the proximity of an enemy affect the mode in which the army should be distributed on the roads selected?

351. Draw a diagram showing how you would form an advanced guard composed as follows, viz :—

1 battalion of infantry;
1 squadron of cavalry;
2 guns;
A detachment of sappers.

Show in figures the distances between each portion; and give your reasons for them, and for the mode of distribution generally.

352. Upon what general principles should the distribution of troops for the defence of a position be based? How many lines are desirable; and what are the duties of each?

353. From what different positions may a defile, generally, be defended? Compare the advantages of each of those methods of defence.

354. If ordered to hold a village with an infantry detachment, on what general plan would you prepare the village for defence; and how would you dispose your detachment for its occupation? If artillery were given to aid you in the defence, how would you post it?

355. Upon what general principles are the three arms utilized in combination for attack; and how far does their use differ when the position attacked is an open position, a wood, or a village?

356. You are placed in charge of a convoy which covers a mile of road, the escort consisting of 1 battalion of infantry, 1 troop of cavalry, and 2 guns.

(*a*) Show by diagram how you would distribute the escort (1) in open country; (2) if the country is enclosed.

(*b*) The road crosses a marsh by a causeway half a mile long, at the further end of which you have reason to believe that a hostile party (subsequently ascertained to consist of infantry and cavalry only) awaits you, concealed by woods. How would you act?

357. Under what conditions is long range infantry fire admissible? State, generally, the nature of the experience gained on this subject in recent wars.

THE END.

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